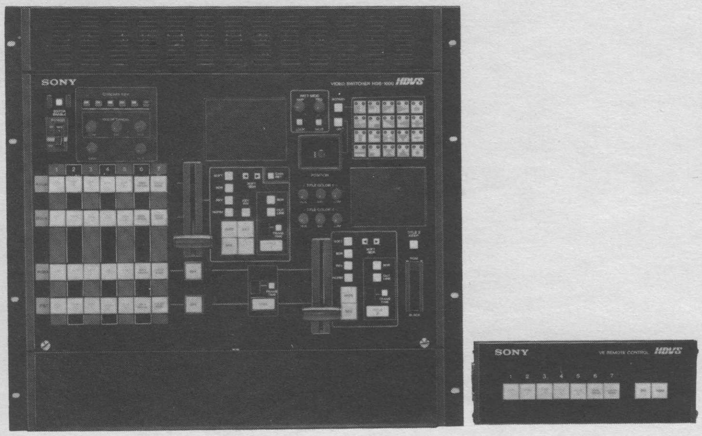
SONY®

HD VIDEO SWITCHER

HDS-1000


SONY
VIDEO SWITCHER HDS-1000 HDVS
SONY
VS REMOTE CONTROL HDVS

HDVS

OPERATION AND MAINTENANCE MANUAL

1 st Edition
Serial No. 10001 and Higher

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SECTION 1 OPERATION

The HDS-1000 is a compact and high-performance portable video switcher with versatile functions, which is designed as a component of the High Definition Video System (HDVS). Using the switcher with HDVS cameras and VTRs, high definition video programs full of variety can be easily produced.

1-1. GENERAL

Various types of inputs and outputs
The unit can accept two title inputs, one gen-lock input as well as seven video inputs. For outputs, it provides two for program, one for preview, one for return video, and one controllable from the supplied remote control unit for a video engineer. In addition, a sync signal output for a black & white camera, two black burst outputs and a tally output for video inputs 1 through 7 plus title inputs 1 and 2 provide a wider variety of system configurations.

Four channel bus lines
A, B bus lines and program, preset bus lines are provided. Special effects, such as mixing and wiping, are possible between A bus and B bus or between the program bus and the preset bus. While mixing A bus and B bus, the preset bus can be additionally mixed in. The "double wipe" function permits selection of a different wipe pattern for each of a wipe between A bus and B bus and a wipe between the program bus and the preset bus.

31 wipe patterns
In addition to 20 basic wipe patterns, 11 "rotary wipe" patterns are available. Special effects as "soft", "border" and "modulation" options can be added to the selected wipe patterns. With some particular wipe patterns, the center position of the wipe can be shifted as desired.

Built-in chroma key function
The built-in chroma key circuit allows an easy chroma key operation with any desired color.

Title-in (superimpose) function
Two title input connectors independently apply titles to A bus/B bus and the program bus/preset bus. The titles can be bordered or be superimposed only by the outline of the characters. The built-in two color generators permit selection of different colors for these two titles.

Color bar and background color generator
The built-in color bar and background color generators provide color bar and background colors with the touch of a single button.

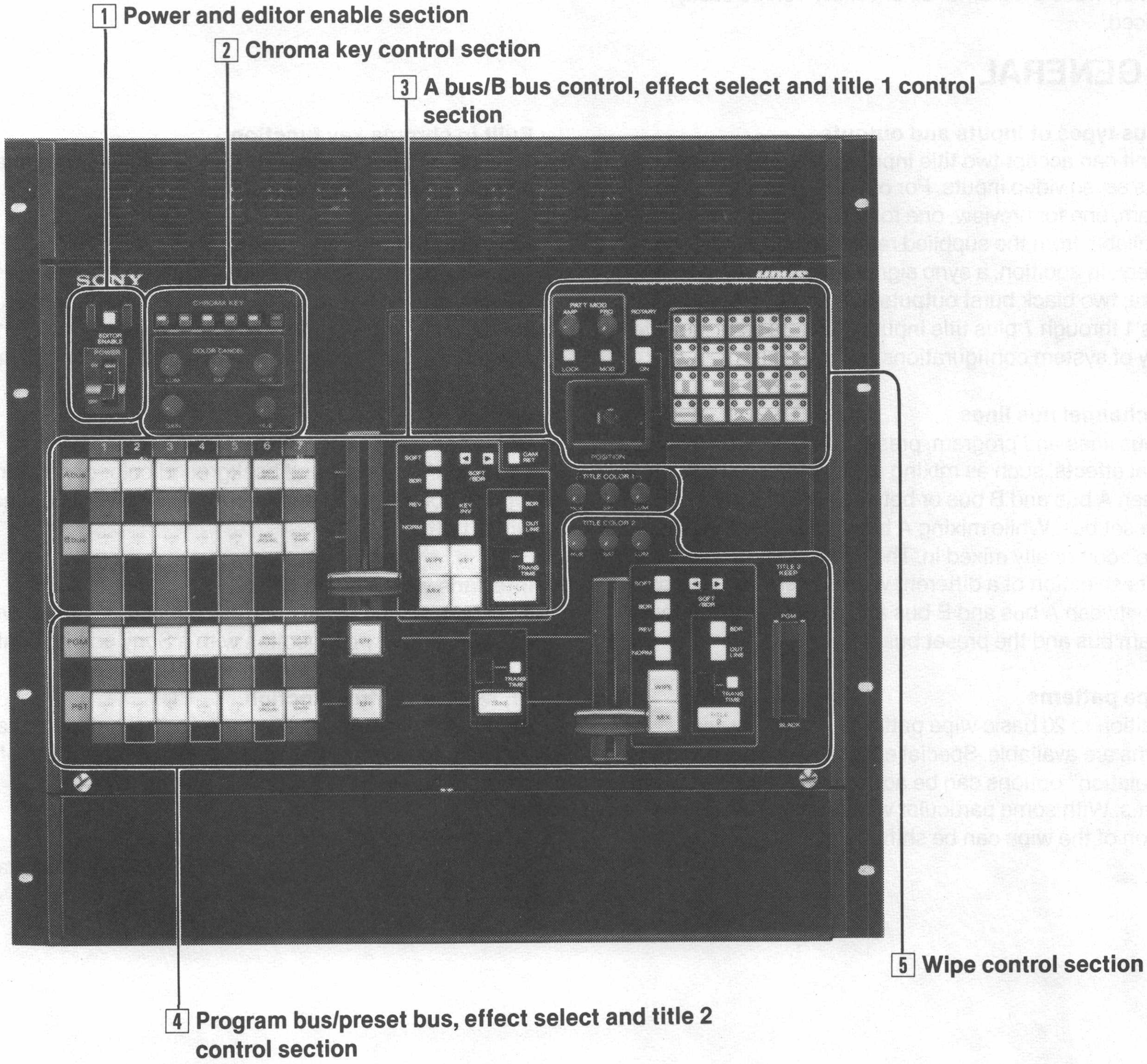
Interface with a video editor
Both parallel and serial interface connectors are provided, enabling an easy connection with a Sony editing control unit.

VE remote control function
An auxiliary output and a remote control unit permit a video engineer to monitor any desired signals regardless of the program output.

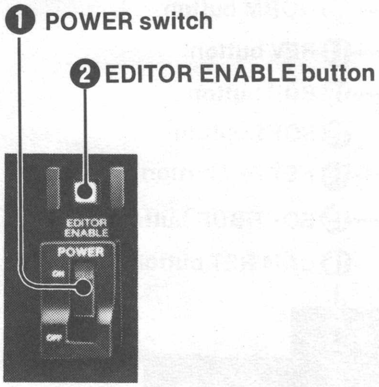
Mounting in a 19-inch standard rack
This unit can be mounted in a 19-inch EIA standard rack.

1-2. LOCATION AND FUNCTION OF PARTS AND CONTROLS

1-2-1. Control Panel


1 Power and editor enable section
2 Chroma key control section
3 A bus/B bus control, effect select and title 1 control section
5 Wipe control section
4 Program bus/preset bus, effect select and title 2 control section

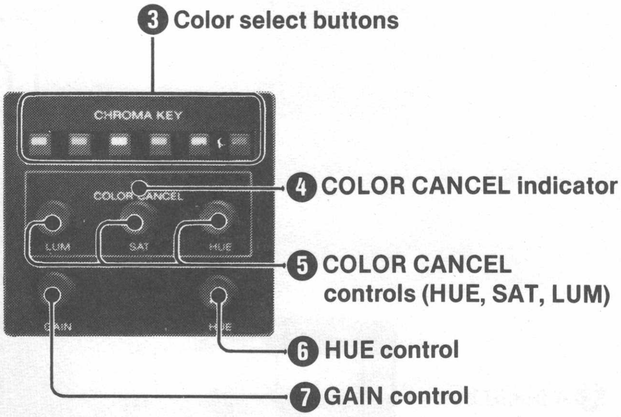
1 Power and editor enable section


❶ POWER switch
❷ EDITOR ENABLE button
EDITOR ENABLE
POWER
ON
OFF

❶ **POWER switch**
Turns the power on when the upper ON side is depressed. To turn off, press the OFF side.

❷ **EDITOR ENABLE button**
When the button is depressed, the button lights up and the unit can be controlled from an editing control unit connected to the REMOTE connector (Editor Enable mode). Press the button again and turn off the button illumination to release the Editor Enable mode.

2 Chroma key control section


❸ Color select buttons
CHROMA KEY
COLOR CANCEL
LUM
SAT
HUE
GAIN
HUE
❹ COLOR CANCEL indicator
❺ COLOR CANCEL controls (HUE, SAT, LUM)
❻ HUE control
❼ GAIN control

❸ **Color select buttons**
Select a color for the chroma key. Press the button with the color corresponding to the background color of the chroma key.

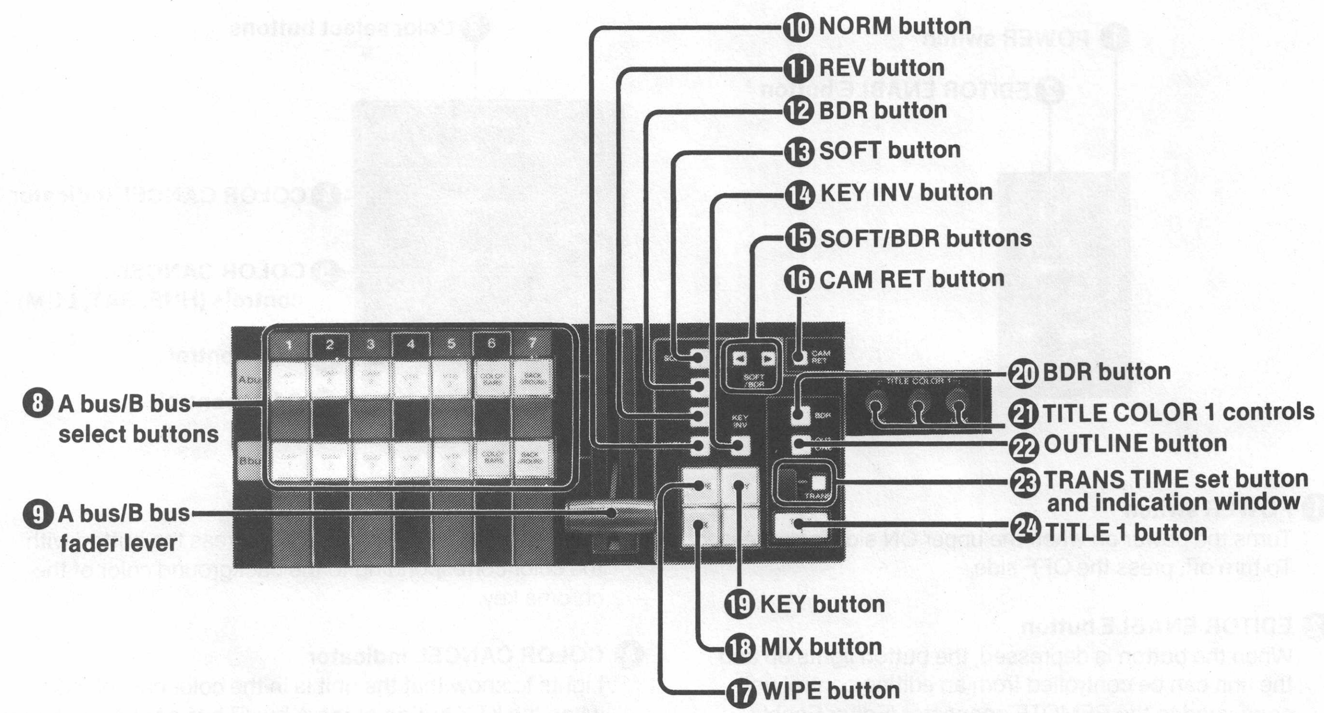
❹ **COLOR CANCEL indicator**
Lights to show that the unit is in the color cancel mode when the KEY button of the A bus/B bus control section is independently depressed.

❺ **COLOR CANCEL controls (HUE, SAT, LUM)**
While the COLOR CANCEL indicator lights, adjust the LUM (luminance), SAT (saturation) and HUE controls so that the background color of the chroma key becomes an achromatic color.

❻ **HUE control**
Adjusts the hue of the picture keyed by chroma key.

❼ **GAIN control**
Adjusts the keying level.

3 A bus/B bus control, effect select and title 1 control section


⑩ NORM button
⑪ REV button
⑫ BDR button
⑬ SOFT button
⑭ KEY INV button
⑮ SOFT/BDR buttons
⑯ CAM RET button
⑳ BDR button
㉑ TITLE COLOR 1 controls
㉒ OUTLINE button
㉓ TRANS TIME set button and indication window
㉔ TITLE 1 button
⑧ A bus/B bus select buttons
⑨ A bus/B bus fader lever
⑲ KEY button
⑱ MIX button
⑰ WIPE button
1
2
3
4
5
6
7
SOFT /BDR
CAM RET
KEY INV
TITLE COLOR 1
BDR
TRANS

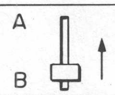
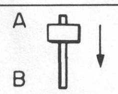
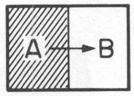
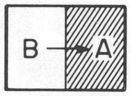
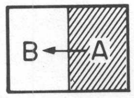
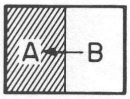
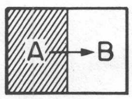
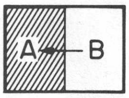
⑧ A bus/B bus select buttons
Select input signal to A bus and B bus, respectively. The buttons 1 through 5 correspond to the VIDEO IN 1 through 5 connectors on the rear connector panel.
When the button 6 is pressed, the color bar generated by the built-in generator is selected. When the button 7 is pressed, the background color is selected. The color of the background is adjusted with the TITLE COLOR 1 controls. The function of the buttons 6 and 7 can be internally modified so that signals to the VIDEO IN 6 and 7 connectors are selected with the buttons. For the modification, refer to Section 2 or later. In chroma key operation, select a signal for the chroma key from A bus line.

⑨ A bus/B bus fader lever
Switches the A bus picture and B bus picture.
The picture of the bus on the lever side is obtained and the indicator of the selected bus line lights. When the power is applied, slide the lever to either end position once.

⑩ NORM (normal) button
Selects the direction of wiping between A bus and B bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from left to right).
When the button is depressed together with the REV button, the direction of wiping changes at each lever stroke (e.g. from right to left at the first stroke and from left to right at the second stroke, and so on).

⑪ REV (reverse) button
Selects the direction of wiping between A bus and B bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from right to left).
When the button is depressed together with the NORM button, the direction of wiping changes at each lever stroke (e.g. from left to right at the first stroke and from right to left at the second stroke, and so on).

Examples of wiping directions and NORM, REV buttons

lever / button		
NORM		
REV		
NORM + REV		

⑫ BDR (border) button

Borders a wipe pattern. The width of the border can be adjusted with the SOFT/BDR buttons.

⑬ SOFT button

Softens the edge of a wipe pattern for wiping between A bus and B bus. The width of the softened edge can be adjusted with the SOFT/BDR buttons.

⑭ KEY INV (key invert) button

Inverts the portions to be keyed-in in a chroma key operation. The first push on the button illuminates the button and the second push turns it off.
Normally, keep the button off. While the button is lit, the portion where the B bus picture is keyed-in is reversed.

⑮ SOFT/BDR (soft/border) buttons

Adjust the width of the softened edge or the border of a wipe pattern.

⑯ CAM RET (camera return) button

When this button is depressed, effects at A bus/B bus are output from the RETURN VIDEO OUT connector regardless of the selection at the PGM bus line. This is especially efficient when adjusting the frame of the picture in a chroma key operation.

⑰ WIPE button

The images of A bus and B bus are wiped with a wipe pattern selected at the wipe control section.

⑱ MIX button

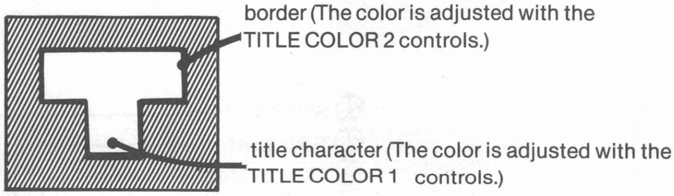
The images of A bus and B bus are switched by mixing. When the power is turned on, the MIX mode is automatically selected.

⑲ KEY button

When the KEY button is independently depressed in chroma key operation, the unit enters the "color cancel" mode and the COLOR CANCEL indicator lights up. When the KEY button is pressed together with the MIX button, the unit enters "key mixing" mode, and the chroma key picture is switched to the B bus picture in mixing when the fader lever is moved to the opposite side. When the KEY button is pressed with the WIPE button, the unit enters the "key wiping" mode, and the chroma key picture is switched to the B bus picture in wiping when the fader lever is moved to the opposite side.

⑳ BDR (border) button

For superimposing a title with a border. Press this button so that the button lights up.

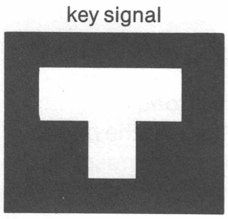

border (The color is adjusted with the TITLE COLOR 2 controls.)
title character (The color is adjusted with the TITLE COLOR 1 controls.)

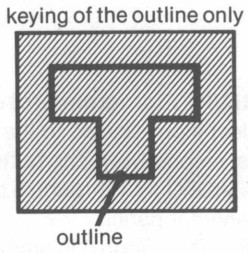
㉑ TITLE COLOR 1 controls

Adjust the color of the title from a camera connected to the TITLE IN 1 connector on the rear connector panel. The background color is adjusted at the same time with the color phase reversed.
LUM (luminance) control: Adjusts the luminance of the color.
SAT (saturation) control: Adjusts the saturation of the color.
HUE control: Adjusts the hue of the color.

㉒ OUTLINE button

For keying only the outline of a title. Press this button so that the button lights up. The color of the outline is adjusted with he TITLE COLOR 2 controls.





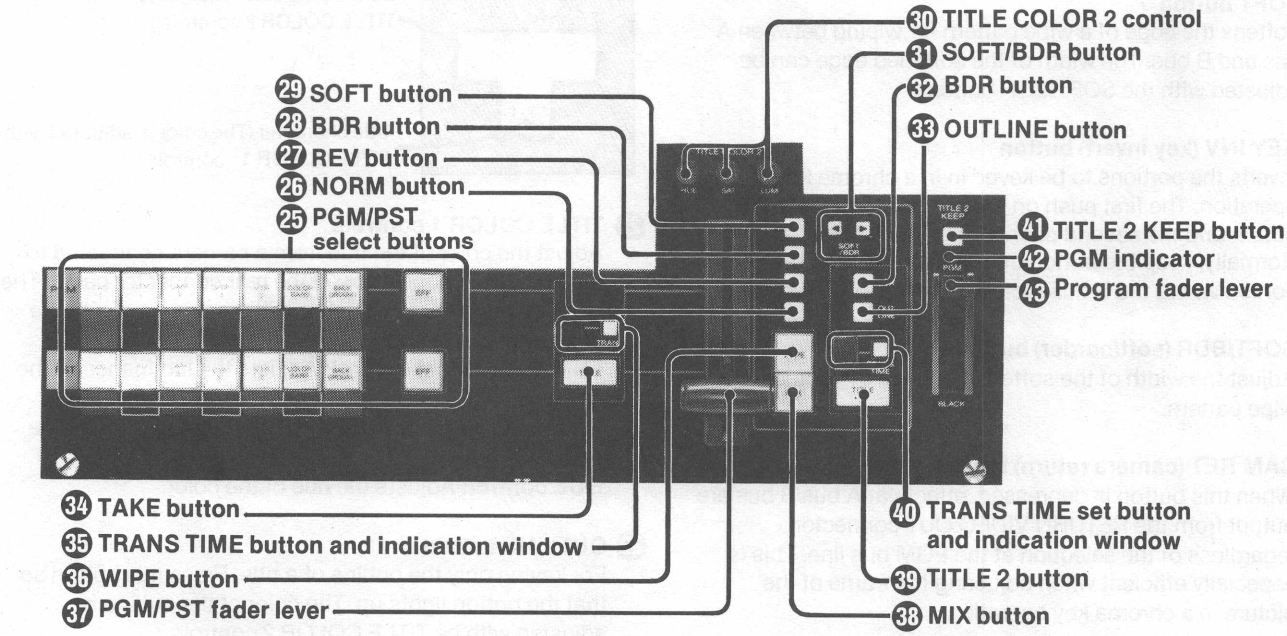
㉓ TRANS TIME (transition time) set button and indication window

Sets the time to fade in and out a title when the TITLE 1 button is pressed. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㉔ TITLE 1 button

Used for superimposing a title from a telop camera connected to the rear TITLE IN 1 connector into the picture selected with the A bus/B bus select buttons. Press this button to superimpose the title. To erase the title, press the button again.
When the button is briefly (within 0.5 second) pressed, the title is cut in or cut out. When the button is pressed for a longer time, the title is faded in or faded out according to the time set with the TRANS TIME set button.
The color of the title is adjusted with the TITLE COLOR 1 controls.

4 Program/preset control, effect select and title 2 control section


㉚ TITLE COLOR 2 control
㉛ SOFT/BDR button
㉜ BDR button
㉝ OUTLINE button
㉙ SOFT button
㉘ BDR button
㉗ REV button
㉖ NORM button
㉕ PGM/PST select buttons
㊶ TITLE 2 KEEP button
㊷ PGM indicator
㊸ Program fader lever
㉞ TAKE button
㉟ TRANS TIME button and indication window
㊱ WIPE button
㊲ PGM/PST fader lever
㊵ TRANS TIME set button and indication window
㊴ TITLE 2 button
㊳ MIX button
TITLE COLOR 2
HUE
SAT
LUM
SOFT /BDR
OUT LINE
TITLE 2 KEEP
PGM
TRANS
TAKE
TIME
BLACK
EFF

㉕ PGM/PST (program/preset) select buttons
Select input signals to the program bus and the preset bus, respectively. The buttons 1 through 5 corresponds to the VIDEO IN 1 through 5 connectors on the rear connector panel.
When the button 6 is pressed, the color bar generated by the built-in generator is selected. When the button 7 is pressed, the background color is selected. The color of the background is adjusted with the TITLE COLOR 1 controls. The function of buttons 6 and 7 can be internally modified so that signals to the VIDEO IN 6 and 7 connectors are selected with the buttons. For the modification, refer to Section 2 or later.

㉖ NORM (normal) button
Selects the direction of wiping between the program bus and the preset bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from left to right). When the button is depressed together with the REV button, the direction of wiping changes at each lever stroke (e.g. from right to left at the first stroke and from left to right at the second stroke, and so on).

㉗ REV (reverse) button
Selects the direction of wiping between the program bus and the preset bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from right to left). When the button is depressed together with the NORM button, the direction of wiping changes at each lever stroke (e.g. from left to right at the first stroke and from right to left at the second stroke, and so on).

㉘ BDR (border) button
Borders a wipe pattern used for wiping between the program bus and preset bus. The width of the border can be adjusted with the SOFT/BDR button.

㉙ SOFT button
Softens the edge of a wipe pattern in wiping between the program bus and the preset bus. The width of the softened edge can be adjusted with the SOFT/BDR buttons.

㉚ TITLE COLOR 2 control
Adjust the color of the title from a camera connected to the TITLE IN 2 connector on the rear panel.
The color of the border of title 1 characters is adjusted at the same time with the color phase reversed.
LUM (luminance) control: Adjusts the luminance of the color.
SAT (saturation) control: Adjusts the saturation of the color.
HUE control: Adjusts the hue of the color.

㉛ SOFT/BDR (soft/border) buttons
Adjust the width of the softened edge or the border of a wipe pattern.

㉜ BDR (border) button
For superimposing a title with a border. Press this button so that the button lights up. The border will be colored only black.

㉝ OUTLINE button
For keying only the outline of a title. Press this button so that the button lights up. The color of the outline is adjusted with the TITLE COLOR 2 control.

㉞ TAKE button
Switches the program bus picture and the preset bus picture. The indicator of the selected bus line lights up. When the button is briefly (within 0.5 second) pressed, the pictures are switched by cut. When the button is pressed for a while, the pictures are switched by fade in a time set with the TRANS TIME set button.

㉟ TRANS TIME (transition time) button and indication window
Sets the time to switch the pictures by pressing the TAKE button. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㊱ WIPE button
The images of the program bus and the preset bus are wiped with a wipe pattern selected at the wipe control section.

㊲ PGM/PST (program/preset) fader lever
Swithces the program bus picture and the preset bus picture.
When the power is applied, once slide the lever to either end position.

㊳ MIX button
The images of the program bus and the preset bus are switched in mixing. When the power is turned on, the MIX mode is automatically selected.

㊴ TITLE 2 button
Used for superimposing a title from a telop camera connected to the rear TITLE IN 2 connector into a picture selected with the PGM bus/PST bus select button. Press this button to superimpose the title. To erase the title, press the button again.
When the button is briefly (within 0.5 second) pressed, the title is cut in or cut out. When the button is pressed for a longer time, the title is faded in or faded out according to the time set with the TRANS TIME set button.
The color of the title is adjusted with the TITLE COLOR 2 controls.

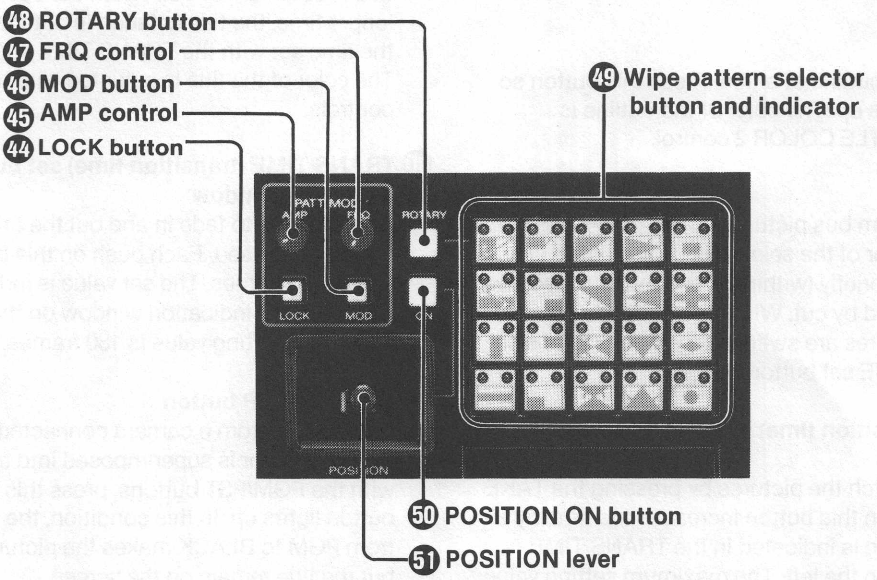
㊵ TRANS TIME (transition time) set button and indication window
Sets the time to fade in and out the title when the TITLE 2 button is pressed. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㊶ TITLE 2 KEEP button
While a title from a camera connected to the rear TITLE IN 2 connector is superimposed into a picture selected with the PGM/PST buttons, press this button so that the button lights up. In this condition, the fader lever stroke from PGM to BLACK makes the picture fade into black but the title remain on the screen.

㊷ PGM indicator
Lights when the program fader lever is not at the PGM position.

㊸ Program fader lever
Normally, set this lever to the PGM side so that the PGM indicator is off. When the lever is moved to the BLACK side, the program picture is faded out into black.

5 Wipe control section


㊽ ROTARY button
㊼ FRQ control
㊻ MOD button
㊺ AMP control
㊹ LOCK button
㊾ Wipe pattern selector button and indicator
PATT
AMP
MOD
FRQ
ROTARY
LOCK
MOD
ON
POSITION
㊿ POSITION ON button
(51) POSITION lever

㊹ LOCK button
To lock the wave in modulation, press this button (the button lights up). To release this mode, press the button again (the button goes off).

㊺ AMP (amplitude) control
Adjusts the amplitude of the wipe modulation while the MOD button is lit.

㊻ MOD (modulation) button
To modulate the wipe pattern, press this button (the button lights up). To release the modulation, press the button again (the button goes off).

㊼ FRQ (frequency) control
Adjusts the wipe modulation frequency while the MOD button is lit.

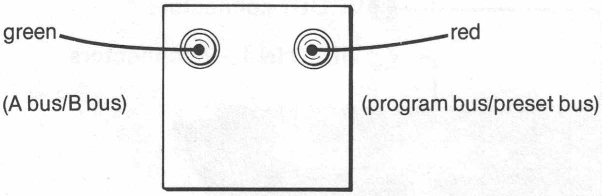
㊽ ROTARY button
Press this button (the button lights up) to activate the rotary capability of the selected wipe pattern. To release this mode, press the button again (the button goes off). The wipe pattern select buttons for the eleven rotary wipe patterns have an arrow or two to indicate the direction of the rotation. The "rotary" function is only effective on wiping between A bus and B bus.

(49) Wipe pattern selector buttons and indicators

Select a wipe pattern to be used. The wipe pattern can be selected independently at the A bus/B bus lines and the program bus/preset bus lines.

To select a wipe pattern for A bus/B bus, press the WIPE button of the A bus/B bus control section and then the desired wipe pattern select button. The depressed button and the green indicator at the upper left corner of the button will light up.

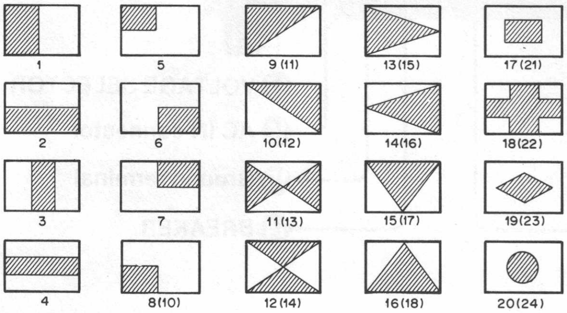
To select a wipe pattern for the program bus/preset bus, press the WIPE button of the program bus/preset bus control section, and then the desired wipe pattern select button. The depressed button and the red indicator at the upper right corner of the button will light up.



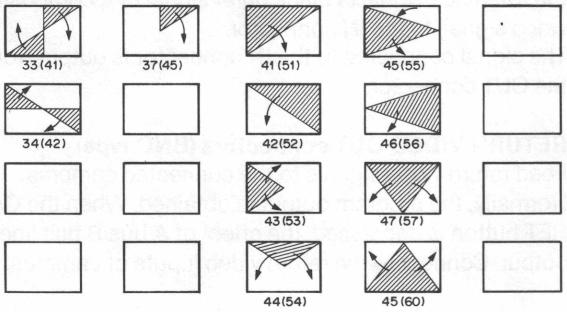
Wipe pattern table

The numbers under patterns refer to the wipe pattern numbers. Use these numbers to select the wipe on an editing control unit.*

Standard wipe patterns



Patterns with rotary capability



(50) POSITION ON button

To shift the center position of the wipe, press this button (the button lights up). To release this mode, press the button again (the button goes off).

(51) POSITION lever

Shifts the center position of the wipe while the POSITION ON button lights.

This lever is effective only on the standard patterns 17 (21), 19 (23), and 20 (24) when these patterns are selected for A bus/B bus. For program bus/preset bus, only patterns 1, 2, 5, 6, 7, 8 (10), 9 (11), 10 (12) can be used while this POSITION lever is used.

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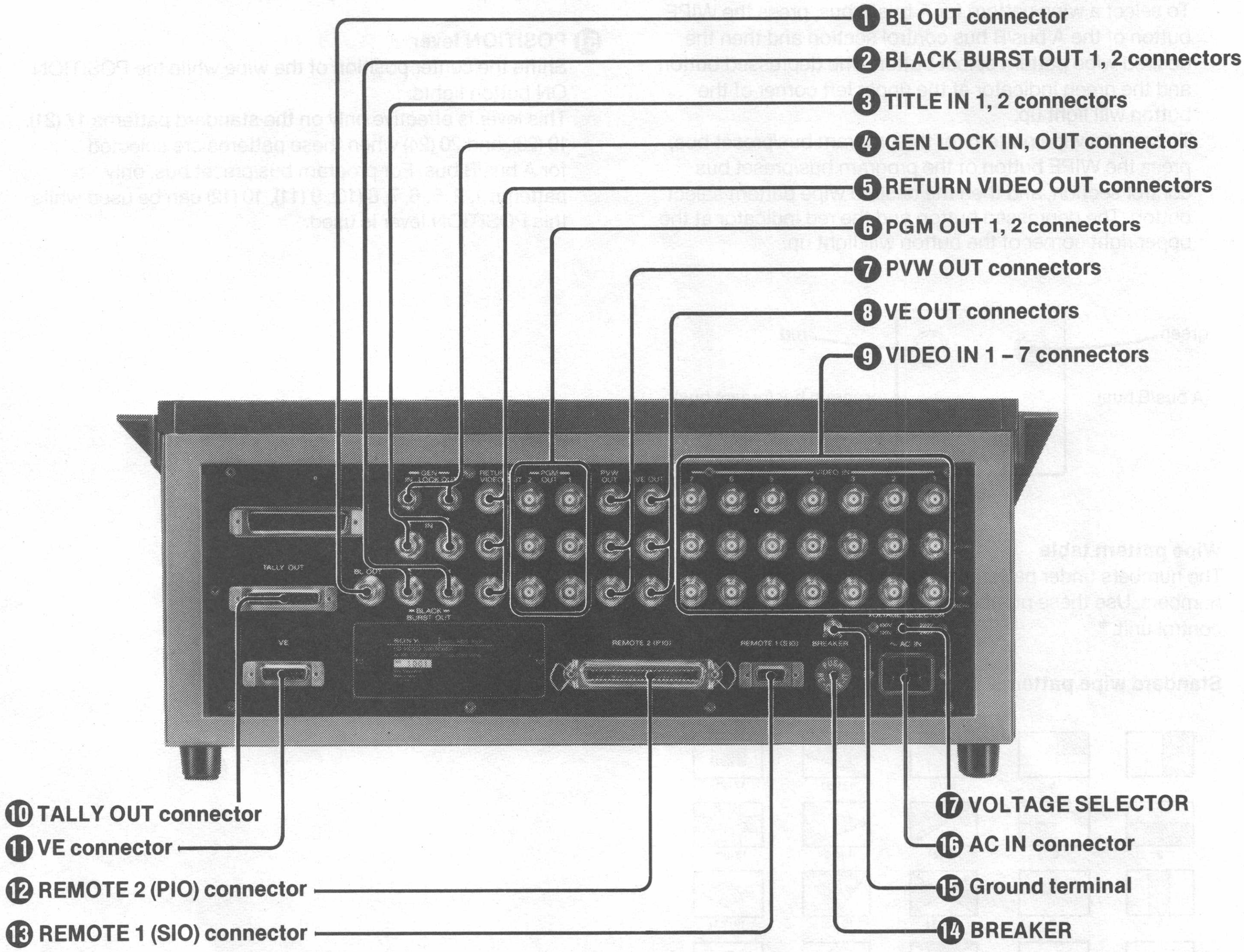
* When connecting the BVE-5000 editing control unit through the parallel interface, use the numbers in parentheses.

1-2-2. Connector Panel


❶ BL OUT connector
❷ BLACK BURST OUT 1, 2 connectors
❸ TITLE IN 1, 2 connectors
❹ GEN LOCK IN, OUT connectors
❺ RETURN VIDEO OUT connectors
❻ PGM OUT 1, 2 connectors
❼ PVW OUT connectors
❽ VE OUT connectors
❾ VIDEO IN 1 – 7 connectors
❿ TALLY OUT connector
⓫ VE connector
⓬ REMOTE 2 (PIO) connector
⓭ REMOTE 1 (SIO) connector
⓱ VOLTAGE SELECTOR
⓰ AC IN connector
⓯ Ground terminal
⓮ BREAKER

❶ BL OUT (blanking output) connector (BNC type)
Outputs a blanking signal for black & white signals. Connect to the BLK IN connector of the HDST-1000 HD telop camera.

❷ BLACK BURST OUT 1, 2 connectors (BNC type)
Output black burst signal for gen-lock. Connect to the black burst input connectors or the gen-lock input connectors of a HDVS VTR or camera.

❸ TITLE IN 1, 2 connectors (BNC type)
Accept signals for title 1 (for A bus/B bus) and title 2 (for program bus/preset bus). Connect to the output connectors of the HDST-1000.

❹ GEN LOCK IN, OUT connectors (BNC type)
To operate the unit with an external sync signal, connect the reference signal (a black burst signal or a composite video signal) to the IN connector.
The signal connected to the IN connector is output from the OUT connector.

❺ RETURN VIDEO OUT connectors (BNC type)
Feed return video signals to the connected cameras. Normally, the program output is obtained. When the CAM RET button is depressed, the effect of A bus/B bus line is output. Connect to the return video inputs of cameras.

❻ PGM OUT (program output) 1, 2 connectors (BNC type)
Feed the final program output. Connect to the video input connectors of a VTR for recording or a program monitor. The connectors 1 and 2 output the same signal.

❼ PVW OUT (preview output) connectors (BNC type)
Feed the signal selected on the preset bus line. Connect to the video input connectors of a preview monitor.

❽ VE OUT (video engineer output) connectors (BNC type)
Feed signals for VE monitoring. Connect to the video input connectors of a monitor.
The output signal at these connectors can be controlled on the supplied remote control connected to the VE connector regardless of the program signal selection.

❾ VIDEO IN 1 – 7 connectors (BNC type)
Accept video signals from video cameras, CCUs or VTRs whose signal is passed through a TBC. Each connector corresponds to one of the A bus/B bus or the program bus/preset bus select buttons 1 through 7 on the front panel.
At the factory, the buttons 6 are reserved for color bar and the buttons 7 are reserved for the background colors. To use the signals connected to the connectors 6 and 7, internal connection must be changed. In this case, the color bar and the background color cannot be used. For details, refer to Section 2 or later.

❿ TALLY OUT connector (25-pin D-sub multi-connector)
Outputs tally signals to equipment connected to the VIDEO IN 1 through 7 and the TITLE IN 1, 2 connectors. This connector is of make-contact type, and the contact capacity is maximum 0.5 A. Connect to the tally input of the equipment by using a 25-pin plug.

Pin assignment

Pin No.	Signal
1, 2	VIDEO IN 1
3, 4	VIDEO IN 2
5, 6	VIDEO IN 3
7, 8	VIDEO IN 4
9, 10	VIDEO IN 5
11, 12	VIDEO IN 6
13, 14	VIDEO IN 7
15, 16	TITLE 1
17, 18	TITLE 2
19 through 25	spare

⓫ VE (VE remote control) connector (15-pin multi)
Connects the supplied VE remote control unit.

⓬ REMOTE 2 (PIO) (remote 2 parallel interface) connector (50-pin)
Connects equipment, such as an editing control unit having a parallel interface.

⓭ REMOTE 1 (SIO) (remote 1 serial interface) connector (9-pin)
Connects equipment, such as an editing control unit having a serial interface.

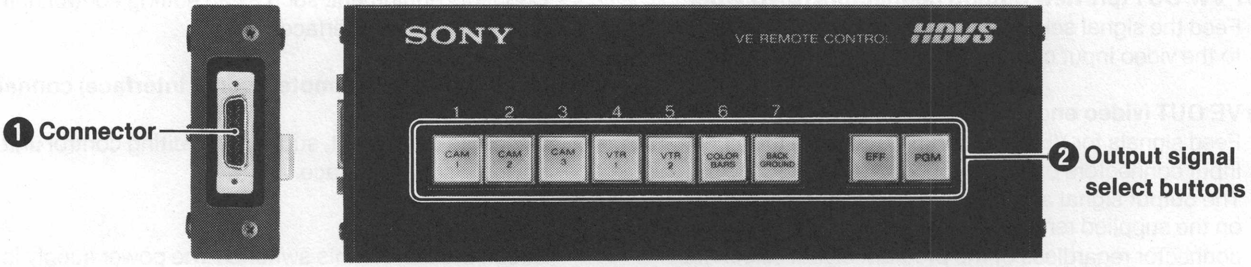
⓮ BREAKER
Circuit breaker for this switcher. The power supply is cut off when overcurrent occurs in the internal circuitry. Turn the power supply back on only after inspecting and adjusting the circuitry and pushing in the breaker.

⓯ Ground terminal
Used if a ground connection is required.

⓰ AC IN connector
Connect to an AC power source using the supplied AC power cord.

⓱ VOLTAGE SELECTOR
Sets the operating voltage of this unit to the local power line voltage.

1-2-3. VE Remote Control


① Connector
SONY
VE REMOTE CONTROL
HDVS
1
2
3
4
5
6
7
CAM 1
CAM 2
CAM 3
VTR 1
VTR 2
COLOR BARS
BACK GROUND
EFF
PGM
② Output signal select buttons

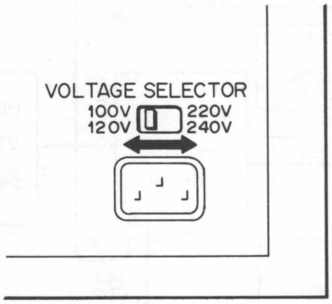
① **Connector**
Connect to the VE connector of the main unit by using the supplied remote control cable.

② **Output signal select buttons (1 – 7, EFF, PGM)**
Select a signal to be output from the VE OUT connectors on the main unit.
1 – 7: A signal of VE bus line corresponding to the depressed button is obtained.
EFF: The result of the effect at A bus /B bus is obtained.
PGM: The program picture is obtained.

1-3. CONNECTIONS AND PREPARATIONS

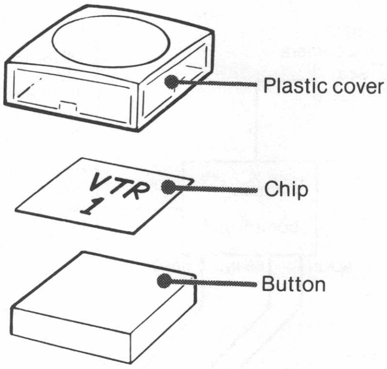
1-3-1. Voltage Adaptation

This unit operates on either 100 – 120 or 220 – 240 V AC. Before the initial use, make sure that the VOLTAGE SELECTOR at the rear of the unit is set to the local power line voltage. If not, reset the switch.


VOLTAGE SELECTOR
100V
120V
220V
240V

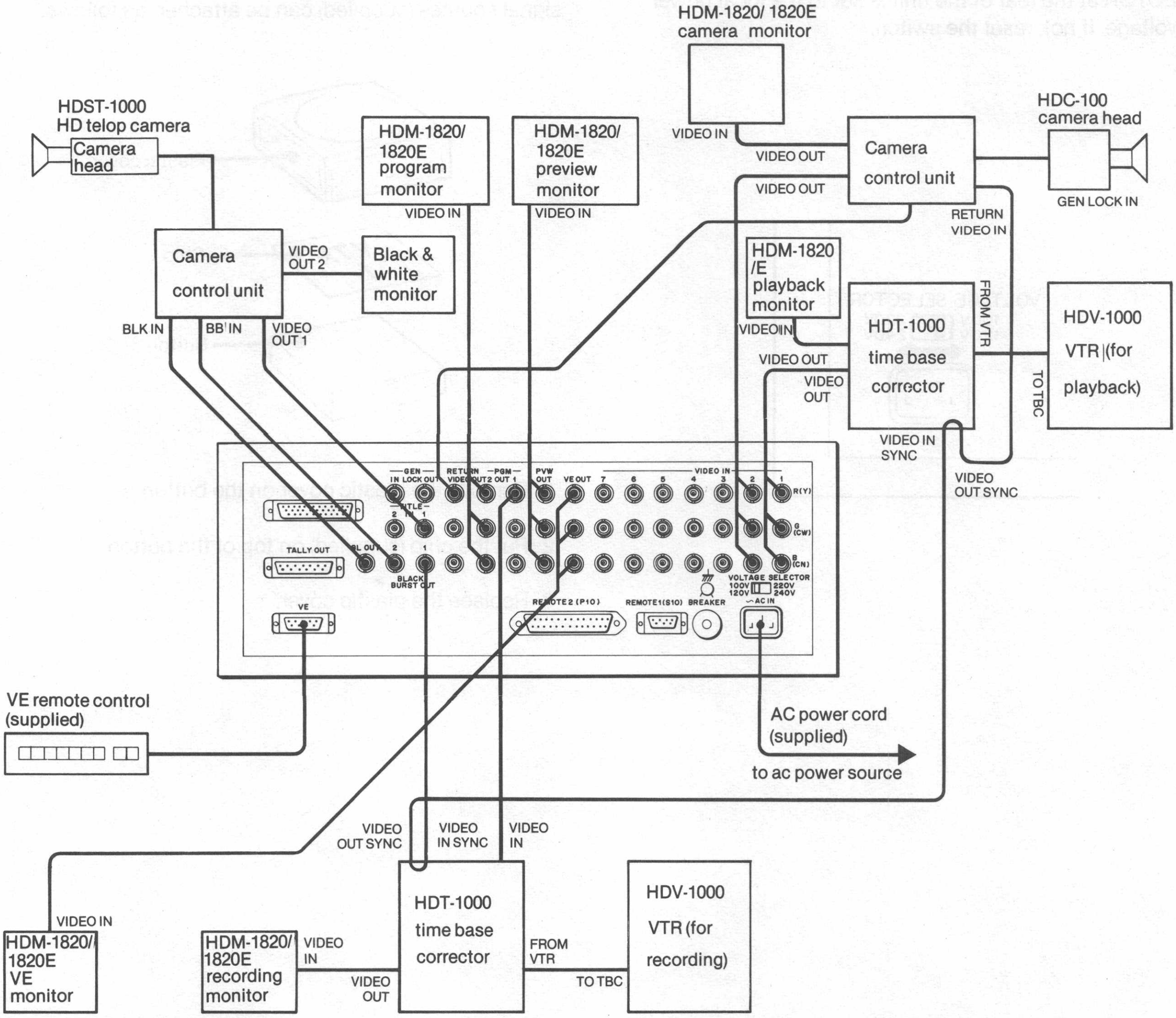
1-3-2. Attaching the Switch Chips on the buttons

On the buttons to select a picture, chips indicating the video signal sources (supplied) can be attached as follows.

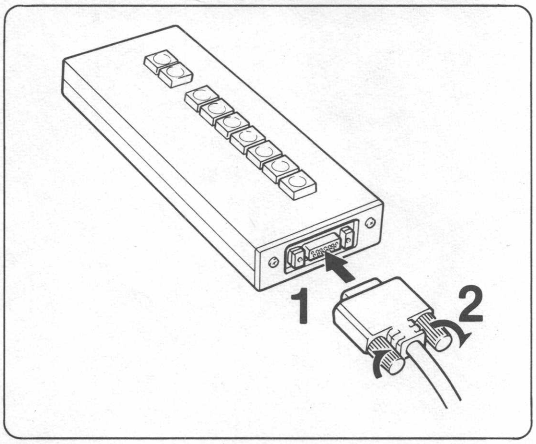

Plastic cover
VTR 1
Chip
Button

1. Remove the plastic cover on the button.
2. Put the chip (supplied) on top of the button.
3. Replace the plastic cover.

1-3-3. Basic Connections


HDM-1820/ 1820E camera monitor
HDST-1000 HD telop camera
Camera head
HDM-1820/ 1820E program monitor
VIDEO IN
HDM-1820/ 1820E preview monitor
VIDEO IN
VIDEO IN
VIDEO OUT
Camera control unit
VIDEO OUT
HDC-100 camera head
GEN LOCK IN
RETURN VIDEO IN
Camera control unit
VIDEO OUT 2
Black & white monitor
BLK IN
BB IN
VIDEO OUT 1
HDM-1820 /E playback monitor
VIDEO IN
HDT-1000 time base corrector
FROM VTR
HDV-1000 VTR (for playback)
TO TBC
VIDEO OUT
VIDEO OUT
VIDEO IN SYNC
VIDEO OUT SYNC
GEN
IN LOCK OUT
RETURN VIDEO OUT
PGM
2 OUT 1
PVW OUT
VE OUT
VIDEO IN
7 6 5 4 3 2 1
R(Y)
G (CW)
B (CN)
TITLE
2 IN 1
TALLY OUT
BL OUT
2 1
BLACK BURST OUT
VOLTAGE SELECTOR
100V 120V 220V 240V
~AC IN
REMOTE 2 (P10)
REMOTE 1 (S10)
BREAKER
VE
VE remote control (supplied)
AC power cord (supplied)
to ac power source
VIDEO OUT SYNC
VIDEO IN SYNC
VIDEO IN
VIDEO IN
HDM-1820/ 1820E VE monitor
HDM-1820/ 1820E recording monitor
VIDEO IN
VIDEO OUT
HDT-1000 time base corrector
FROM VTR
TO TBC
HDV-1000 VTR (for recording)

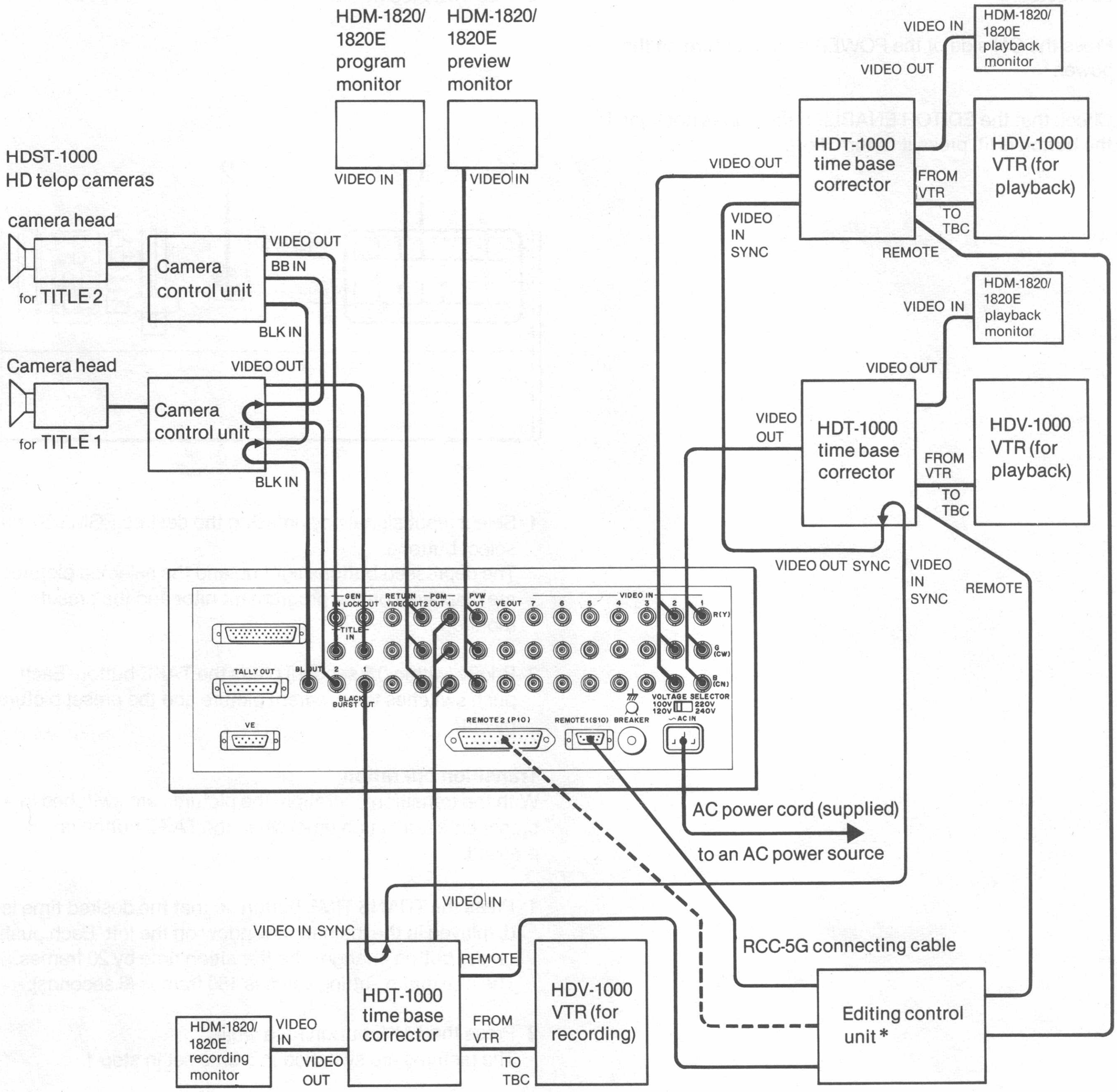
Connection of the remote control cable



Note

The unit is equipped with two black burst output connectors for synchronisation. Should more than two outputs be required, use a distribution amplifier for black burst signal.

1-3-4. Connection Example for Editing


HDM-1820/
1820E
program
monitor
HDM-1820/
1820E
preview
monitor
VIDEO IN
VIDEO IN
HDST-1000
HD telop cameras
camera head
for TITLE 2
Camera
control unit
VIDEO OUT
BB IN
BLK IN
Camera head
for TITLE 1
Camera
control unit
VIDEO OUT
BLK IN
HDM-1820/
1820E
playback
monitor
VIDEO IN
VIDEO OUT
HDT-1000
time base
corrector
VIDEO OUT
VIDEO
IN
SYNC
FROM
VTR
TO
TBC
REMOTE
HDV-1000
VTR (for
playback)
HDM-1820/
1820E
playback
monitor
VIDEO IN
VIDEO OUT
VIDEO
OUT
HDT-1000
time base
corrector
FROM
VTR
TO
TBC
HDV-1000
VTR (for
playback)
VIDEO OUT SYNC
VIDEO
IN
SYNC
REMOTE
GEN
IN LOCK OUT
RETURN
VIDEO OUT 2
PGM
OUT 1
PVW
OUT
VE OUT
VIDEO IN
7
6
5
4
3
2
1
R(Y)
G
(CW)
B
(CN)
TITLE
IN
TALLY OUT
BL OUT
2
1
BLACK
BURST OUT
VOLTAGE SELECTOR
100V
120V
220V
240V
VE
REMOTE 2 (P10)
REMOTE 1(S10)
BREAKER
AC IN
AC power cord (supplied)
to an AC power source
VIDEO IN
VIDEO IN SYNC
REMOTE
HDT-1000
time base
corrector
HDV-1000
VTR (for
recording)
FROM
VTR
TO
TBC
HDM-1820/
1820E
recording
monitor
VIDEO
IN
VIDEO
OUT
RCC-5G connecting cable
Editing control
unit *

To make connector cable, use shielded multi-cables and EMI treated shells only.

Recommended multi-cables

Should conform with the UL STYLE 2464 AWG 28.

e.g. HITACHI CABLE Ltd. CO-MA-VV (shielded) series

Recommended shells

JAE DD-C4-J13 or DD-C8-J13-F1-1

Recommended connector

JAE DD-50PF-N

* In case that the editing control unit is BVE-5000, use either of the REMOTE 1 or the REMOTE 2 connector for the connection. In case of the BVE-900, use the REMOTE 1 connector.

1-4. OPERATION

1-4-1. Set-up

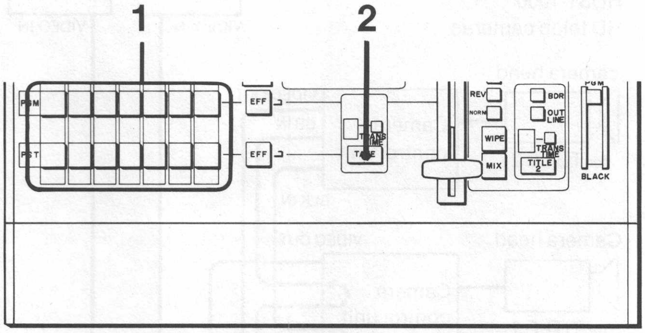
1 Check that all equipment to be used are correctly connected.

2 Press the ON side of the POWER switch to turn on the power.

3 Check that the EDITOR ENABLE button does not light. If the button is lit, press it to turn it off.

1-4-2. Cut-in/cut-out

The picture of the program bus and that of the preset bus can be switched by cut.



1 Select input signals by pressing the desired PGM/PST bus select buttons.
The depressed buttons light up and the selected pictures are displayed on the program monitor and the preset monitor.

2 Briefly (within 0.5 second) press the TAKE button. Each push switches the program picture and the preset picture by cut.

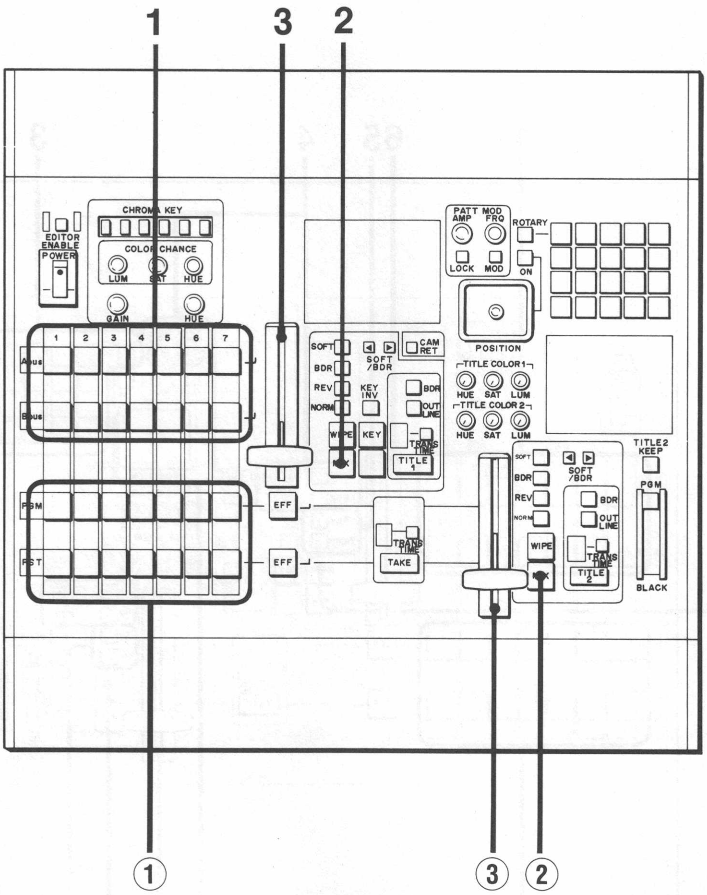
Transition operation
With the transition operation, the pictures are switched in a preset time (transition time) when the TAKE button is pressed.

1 Press the TRANS TIME button so that the desired time is displayed in the indication window on the left. Each push on the button changes the transition time by 20 frames. The maximum setting value is 180 frames (6 seconds).

2 Press the TAKE button for a while.
The pictures are switched in a time set in step 1.

1-4-3. Mixing

The pictures can be switched between A bus and B bus or between the program bus and the preset bus by mixing (dissolve).


1
3
2
CHROMA KEY
EDITOR ENABLE
POWER
COLOR CHANCE
LUM
SAT
HUE
GAIN
HUE
A bus
B bus
PGM
PST
EFF
EFF
SOFT
BDR
REV
NORM
SOFT /BDR
KEY INV
CAM RET
WIPE
KEY
MIX
BDR
OUT LINE
TRANS TIME
TITLE 1
TAKE
PATT AMP
MOD FRQ
ROTARY
LOCK
MOD
ON
POSITION
TITLE COLOR 1
HUE
SAT
LUM
TITLE COLOR 2
TITLE 2 KEEP
PGM
BLACK
TITLE 2
①
③
②

1 Select pictures to be mixed with the A bus/B bus select buttons or the PGM/PST select buttons. The depressed buttons will light up.

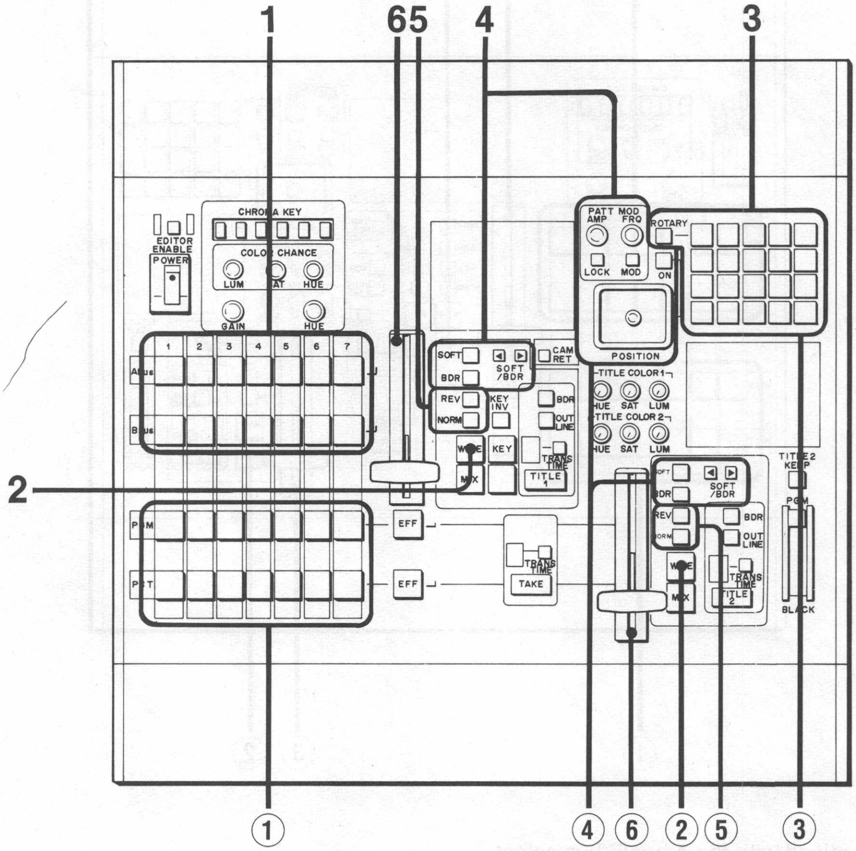
2 Press the MIX button of the selected bus control section. The MIX button will light up.

3 Slide the A bus/B bus fader lever or the PGM/PST fader lever from one side to the other. The pictures are mixed and then switched according to the movement of the lever. When mixing the A bus picture and the B bus picture, the bus indicator of the lever side will light up. When mixing the program bus picture and the preset bus picture, the indicator of the bus which is selected as the program output will light up.

1-4-4. Wipe

The pictures can be switched between A bus and B bus or between the program bus and the preset bus by wipe. 20 standard wipe patterns and 11 rotary wipe patterns are provided to be selected independently for A bus/B bus and for the program/ preset bus.

Operation


1
6
5
4
3
2
CHROMA KEY
COLOR CHANCE
LUM
SAT
HUE
GAIN
HUE
EDITOR ENABLE
POWER
A bus
B bus
1
2
3
4
5
6
7
PGM
PST
EFF
EFF
SOFT
BDR
REV
NORM
SOFT /BDR
KEY INV
CAM RET
BDR
OUT LINE
WIPE
MIX
KEY
TRANS TIME
TITLE 1
TRANS TIME
TAKE
PATT MOD
AMP
FRQ
ROTARY
LOCK
MOD
ON
POSITION
TITLE COLOR 1
HUE
SAT
LUM
TITLE COLOR 2
HUE
SAT
LUM
TITLE 2 KEEP
PGM
BLACK
①
④
⑥
②
⑤
③

1 Press the A bus/B bus select buttons or the PGM/PST select buttons to select the pictures for wiping. The depressed buttons will light up.

2 Press the WIPE button of the A bus/B bus or PGM/PST control section. The WIPE button will light.

3 Press the desired wipe pattern select button to select the wipe pattern to be used.
When the WIPE button of the A bus/B bus control section is pressed in step 2, the green indicator on the upper left corner will light up. When the WIPE button of the PGM/PST control section is pressed in step 2, the red indicator at the upper right corner will light up.

- It is possible to use the same pattern for both the A bus/B bus and the PGM/PST bus. In this case, both the green and red indicators light.
- When using a rotary wipe, press the ROTARY button and then the wipe pattern select button, which has an arrow showing the direction of the wipe. (The rotary wipe is effective only for wiping on A bus/B bus.)

4 When adding a special effect (soft, border or modulation, or when shifting the center of the wipe (positioner), select the desired effect.
For details, refer to the respective discription below.

5 Select the direction of the wipe with the REV button and/or the NORM button.

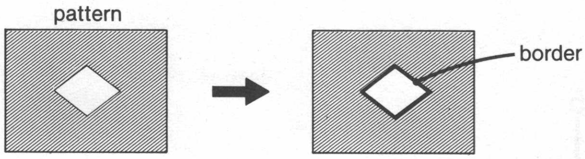
6 Slide the A bus/B bus fader lever or the PGM/PST fader lever from one side to the other. The pictures are wiped and then switched according to the movement of the lever. When wiping the A bus picture and the B bus picture, the bus indicator of the lever side will light up. When wiping the program bus picture and the preset bus picture, the indicator of the bus selected as the program output will light up.

Soft
The edge of the wipe pattern can be shaded off.

1 Press the SOFT button so that the button lights up.

2 Press the SOFT/BDR buttons to adjust the width of the softened area.

Border
A border can be added to the edge of the wipe pattern.

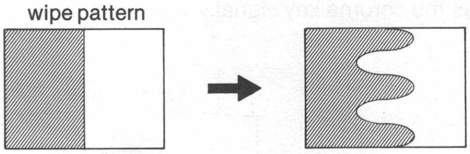


1 Press the BDR button so that the button lights up.

2 Press the SOFT/BDR buttons to adjust the width of the border.

3 For wiping between A bus and B bus, adjust the color of the border with the TITLE COLOR 1 controls. For wiping between the program bus and the preset bus, the color of the border is fixed to black and the color adjustment is not possible.

Modulation
The vertical edge of a wipe pattern can be modulated in a wave form.

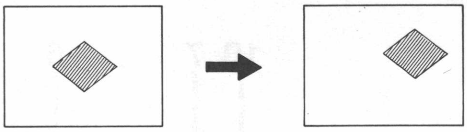


1 Press the MOD button so that the button lights up. The edge of the wipe pattern will be modulated.

2 Adjust the modulation frequency and amplitude with the AMP control and the FRQ control.

- To lock the wave of the modulation, press the LOCK button so that the button lights up.
- The edge of rotary wipe patterns cannot be modulated.
- The modulation is only effective on wiping between A bus and B bus.

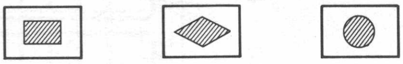
Positioner (shifting the center position)
For three patterns of the standard wipe patterns, the center position can be shifted. This effect is effective only when wiping between A bus and B bus.



1 Press the POSITION ON button so that the button lights up.

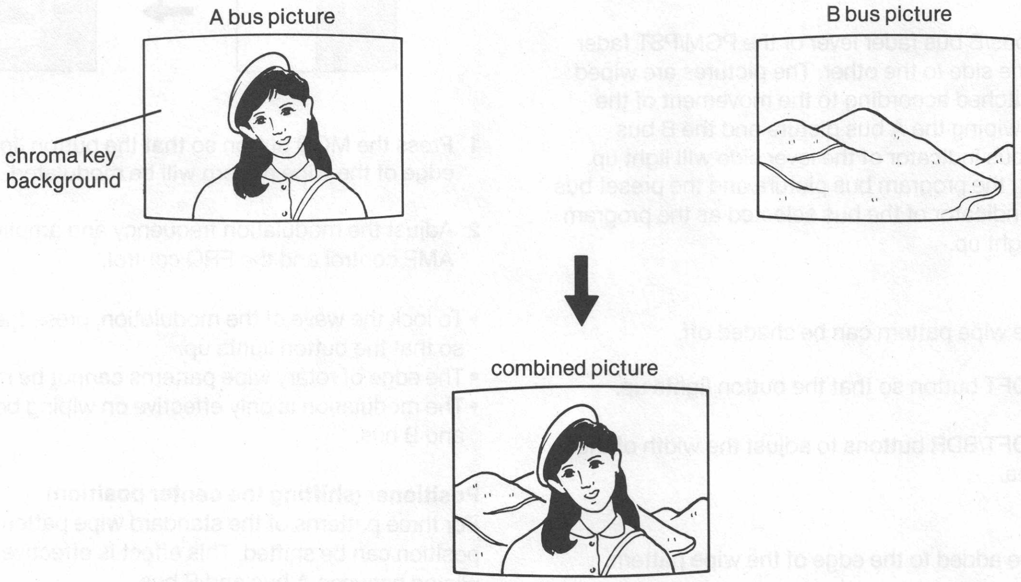
2 Move the POSITION lever to adjust the center position of the pattern.

Patterns with the positioner capability

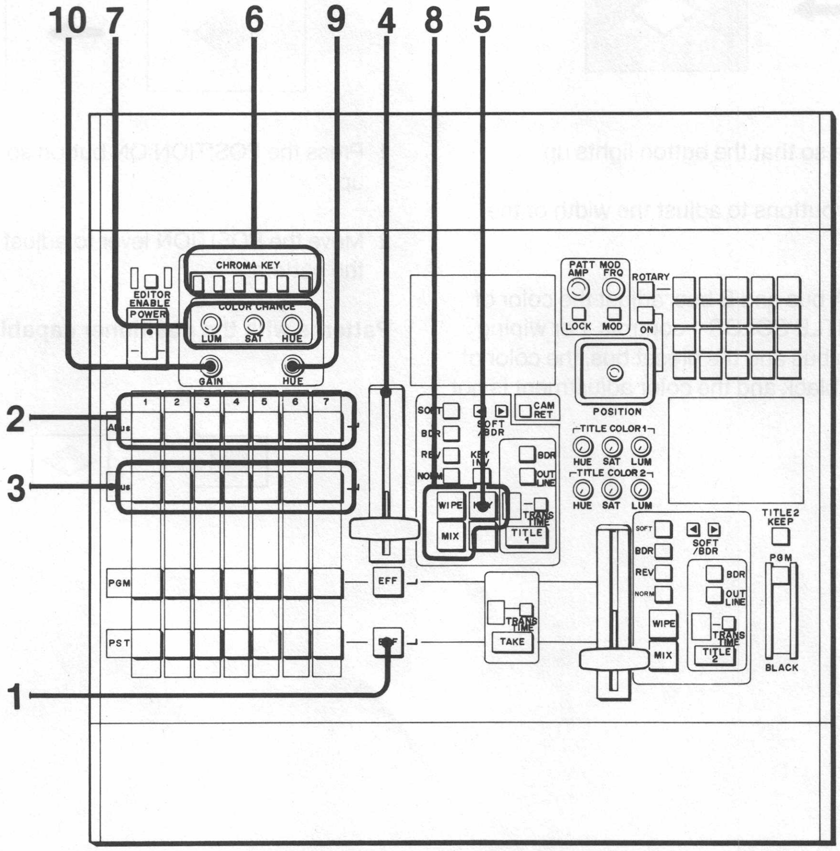


1-4-5. Chroma Key

Chroma key operation is possible by using the A bus/B bus. Normally, the B bus picture is keyed in by using the A bus picture as the chroma key signal.


A bus picture
B bus picture
chroma key background
combined picture

Operation


10
7
6
9
4
8
5
2
3
1
CHROMA KEY
COLOR CHANCE
LUM
SAT
HUE
GAIN
HUE
EDITOR ENABLE
POWER
PGM
PST
EFF
PATT MOD
AMP
FRQ
LOCK
MOD
ROTARY
ON
POSITION
TITLE COLOR 1
TITLE COLOR 2
SOFT
BDR
REV
NORM
WIPE
MIX
SOFT /BDR
KEY INV
CAM RET
OUT LINE
TRANS TIME
TITLE 1
TAKE
TITLE 2
TITLE 2 KEEP
BLACK

1 Press the EFF button of the PST bus select buttons.

2 Select the signal to be used for the chroma key with the A bus select buttons.

3 Select the picture to be keyed in with the B bus select buttons.

4 Slide the fader lever to the A side.

5 Press the KEY button. The COLOR CANCEL button will light up and the unit will enter the color cancel mode.

6 Press the color select button corresponding to the color used for the chroma key.

7 Observing the preview monitor, adjust the HUE, SAT and LUM controls so that the chroma key color becomes an achromatic color.

8 Press the KEY button with the MIX button or with the WIPE button. (Refer to "key mixing/key wiping operation" below.) The B bus picture is keyed into the A bus picture.

9 Adjust the hue of the keyed picture with the HUE control properly.

10 Adjust the level of the keyed signal with the GAIN control.

- To obtain the combined picture with the A bus portion and the B bus portion reversed, press the KEY INV button so that the button lights.

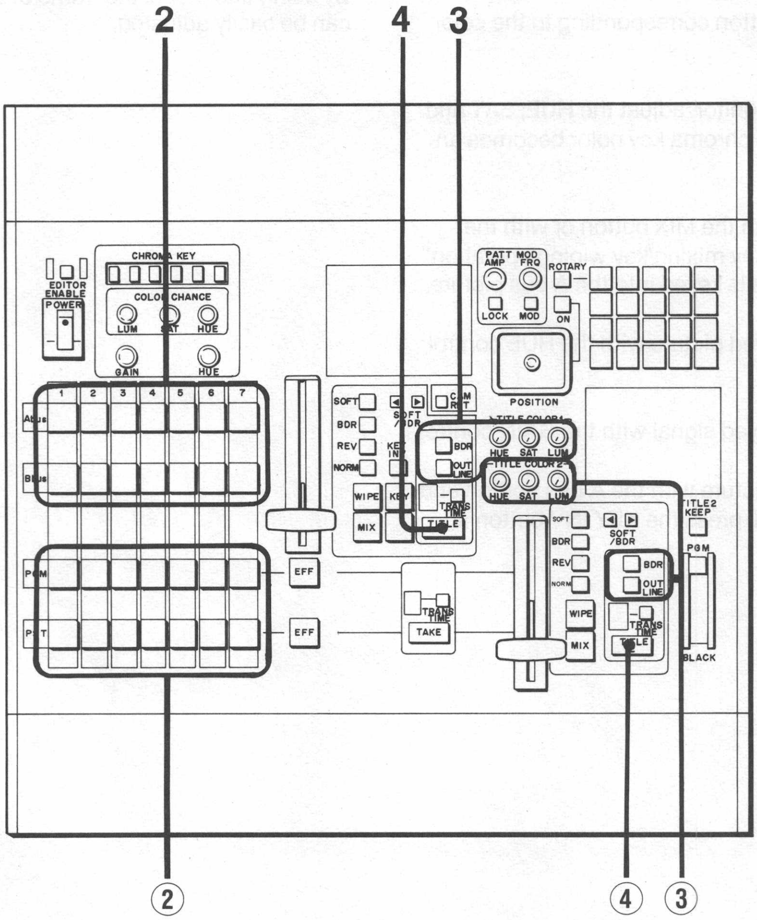
Key mixing/key wiping operation
The section of the MIX or WIPE button determines the way the original picture is resumed. By moving the fader lever to the opposite side, the original picture will be resumed by key mixing if the MIX button was pressed, or by key wiping if the WIPE button was pressed, in step 8 above.

Adjusting the picture frame
When the CAM RET button is depressed and the button lights, the effect of the A bus/B bus will be output as a return video output regardless of the selection by the PGM select buttons.
By using this mode, the frame of the picture for chroma key can be easily adjusted.

1-4-6. Superimposing the Title

Titles can be superimposed into the output signal of the A bus/B bus and that of the program bus/preset bus. The signal from a camera connected to the TITLE 1 connector is superimposed into the A bus/B bus output. The signal from a camera connected to the TITLE 2 connector is superimposed into the program bus/preset bus output.

Basic operation


2
4
3
CHROMA KEY
EDITOR ENABLE
POWER
COLOR CHANCE
LUM
SAT
HUE
GAIN
HUE
PATT MOD
AMP
FRQ
LOCK
MOD
ROTARY
ON
POSITION
1
2
3
4
5
6
7
A bus
B bus
PGM
PST
EFF
EFF
SOFT
BDR
REV
NORM
SOFT /BDR
KEY INV
CAM RET
WIPE
KEY
MIX
TRANS TIME
TITLE
TITLE COLOR 1
BDR
OUT LINE
TITLE COLOR 2
HUE
SAT
LUM
TRANS TIME
TAKE
SOFT
BDR
REV
NORM
SOFT /BDR
BDR
OUT LINE
WIPE
MIX
TRANS TIME
TITLE
TITLE2 KEEP
PGM
BLACK
②
④
③

1 Adjust the camera for shooting the title.

2 Select the destination picture with the A bus/B bus select buttons or the program/preset buttons.

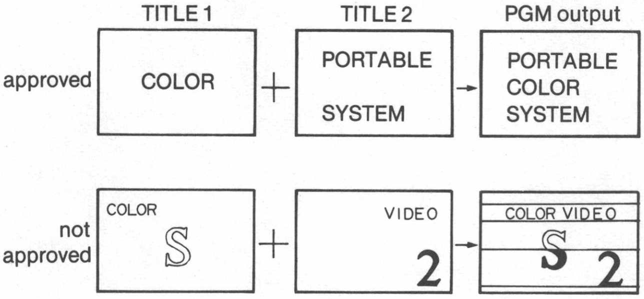
3 When adding a special effect to the title, select the effect. For details on the effects, refer to the respective description below.

4 When the title is to be inserted into the A bus/B bus output, press the TITLE 1 button. When the title is to be inserted into the program/preset bus output, press the TITLE 2 button. The depressed button will light up and the title will be superimposed.

- When the TITLE 1 or TITLE 2 button is briefly (within 0.5 second) pressed, the title is superimposed by cut. When the button is pressed for a while, the title is superimposed by fade-in in the time set with the TRANS TIME button.

Note

When using both titles 1 and 2 simultaneously, be sure to adjust the positions of the titles to avoid their being superimposed overlapping each other.



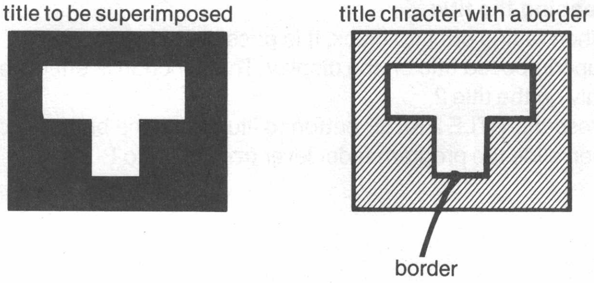
To erase the title
Press the TITLE 1 or TITLE 2 button again. When the button is briefly pressed, the title is erased by cut. When the button is pressed for a longer time, the title is erased by fade-out.

Setting the fade time
Press the TRANS TIME set button so that the desire time is displayed in the indication window on the left. Each push on the button changes the time by 20 frames. The maximum setting time is 180 frames (6 seconds).

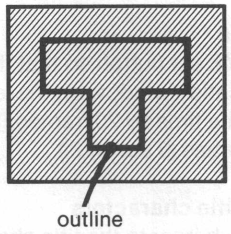
Special effects for title characters
It is possible to give a border to the title characters and to key in only the outline of characters. For the title characters themselves, the border (only for A bus/B bus) and the outline can be colored as desired.

Adjusting the title character color
The color of the title characters in the A bus/B bus picture is adjusted with the TITLE COLOR 1 controls and in the color of those program bus/preset bus picture is adjusted with the TITLE COLOR 2 controls.
Adjust the hue with the HUE control, the color saturation with the SAT control and the luminance with the LUM control.

Bordering the title
Press the BDR button of the TITLE 1 or TITLE 2 control section. The superimposed title will be bordered. The border color of title 1 will be a color with a different (nearly reversed) color phase with that adjusted with the TITLE 2 COLOR controls. Title 2 is always bordered in black only.



Superimposing the outline of the title
Press the OUTLINE button so that the button lights up. Only the outline of the title characters will be superimposed.



Adjusting the title character, border and outline colors

	Title 1	Title 2
Color of title	Color adjusted with the TITLE COLOR 1 controls.	Color adjusted with the TITLE COLOR 2 controls.
Color of border	Color with the nearly reversed phase of the color adjusted with the TITLE COLOR 2 controls.	Black
Color of outline		Color adjusted with the TITLE COLOR 2 controls.

Fading out into black
The program fader lever is normally set on the PGM side. By sliding the lever from the PGM to BLACK after superimposing a title, the program output can be faded out into black.

Keeping the title
When fading out into black, it is possible to leave only the superimposed title on the display. This function is effective only on the title 2.
Press the TITLE 2 KEEP button to illuminate the button and then slide the program fader lever from PGM to BLACK.

1-4-7. Operation on an Editing Control Unit

This unit is equipped with a serial interface (REMOTE 1) and a parallel interface (REMOTE 2). An editing control unit can be connected to either of these interface connectors and the switcher can be remotely controlled. The band rate switch and the RS232C/422 switch for the REMOTE 1 are provided inside the unit. For details, refer to Section 2 or later.
When controlling from the editing control unit, press the EDITOR ENABLE button so that the button lights up. While this button lights, none of the buttons and controls on the control panel of the switcher are operative and operations must be performed on the editing control unit.

Refer to the instructions furnished with the edting control unit for the operation.

When using the BVE-5000
Use either the REMOTE 1 or REMOTE 2 connector for the connection. The optional BR-5022A and BK-5021 printed circuit boards must be installed in the BVE-5000.

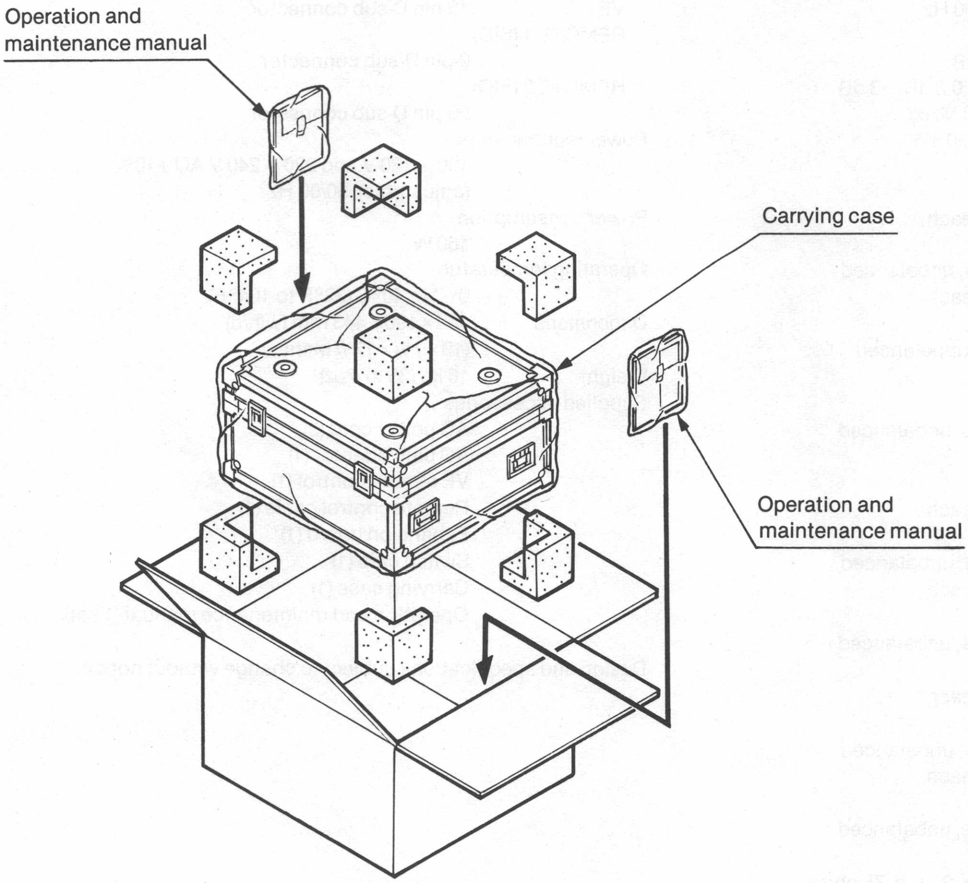
When using the BVE-900
Use the REMOTE 1 connector for the connection. The optional BK-912 printed circuit board must be installed in the BVE-900.

1-5. SPECIFICATIONS

System	Resolution: 1125 lines 2 : 1 interlace Horizontal frequency: 33.75 kHz, 1125 lines/frame Vertical frequency: 60 Hz
Frequency response	Up to 20 MHz: ±0.3 dB 20 MHz – 30 MHz: + 0.3 dB, −3 dB
Crosstalk	Less than −40 dB (30 MHz)
Linearity (DG)	Less than 2 % (APL 50 %)
Inputs	
VIDEO IN 1 – 7	R(Y), G(CW), B(CN) 1 each, BNC connectors VBS 1 Vp-p, 75 ohms, unbalanced
TITLE IN 1, 2	R(Y), G(CW), B(CN) 1 each, BNC connectors VS 1 Vp-p, 75 ohms, unbalanced
GEN LOCK IN, OUT (through output)	BNC connectorS BS 0.3 Vp-p, 75 ohms, unbalanced
Outputs	
PGM OUT 1, 2	R(Y), G(CW), B(CN) 1 each BNC connectors VBS 1 Vp-p, 75 ohms, unbalanced
PVW OUT	R(Y), G(CW), B(CN) 1 each BNC connector VB 0.7 Vp-p, 75 ohms, unbalanced
RETURN VIDEO	R(Y), G(CW), B(CN) 1 each BNC connector VBS 1 Vp-p, 75 ohms, unbalanced
VE	R(Y), G(CW), B(CN) 1 each BNC connector VB 0.7 Vp-p, 75 ohms, unbalanced
BL OUT	BNC connector BLK signal, negative, 2 Vp-p, 75 ohms unbalanced
BLACK BURST OUT 1, 2	BNC connector BS 0.3 Vp-p, 75 ohms, unbalanced
TALLY	25-pin D-sub multi-connector (for inputs 1 through 7 and titles 1 and 2) Contact closure, 0.5 A max.
Interface connectors	
VE	15-pin D-sub connector
REMOTE 1 (SIO)	9-pin D-sub connector
REMOTE 2 (PIO)	50-pin D-sub connector
Power requirements	100 – 120 V and 220 – 240 V AC ±10% (adjustable), 50/60 Hz
Power consumption	160 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Dimensions	482 × 196 × 443 mm (w/h/d) (19 × 7 3/4 × 17 1/2 inches)
Weight	16 kg (35 lb 4 oz)
Supplied accessories	AC power cord (2) AC plug adaptor (1) VE remote control (1) Remote control cable (1) Expansion board (1) Switch chip (1) Carrying case (1) Operation and maintenance manual (1 set)

Design and specifications subject to change without notice.

1-6. PACKING


Operation and maintenance manual
Carrying case
Operation and maintenance manual

SECTION B
SEMICONDUCTOR PIN ASSIGNMENTS

The circuit diagram of is obtained from the IC data book published by the manufacturer.

TYPE PAGE

10DF2 ....B-2
10E-2 ....B-2

1S1555.......B-2
1SS119.......B-2
1SS133.......B-2
1SS148.......B-2
1SS168.......B-2

2SA1005......B-2
2SA1015......B-2
2SA1175......B-2
2SA1206-K1...B-2
2SA952.......B-2

2SC1815-Y....B-2
2SC2668......B-2
2SC2785......B-2
2SC2786-L....B-2
2SC2901......B-2

2SK152.......B-2

5082-7300....B-3
74F283PC.....B-3

AD580M.......B-3
AD7524JN.....B-3

AM26LS31CN...B-3
AM26LS31PC...B-3
AM26LS32ACN..B-3
AM26LS32PC...B-3

BX1412.......B-4

CA3080E......B-4
CA3102E-S1...B-4

CX23065......B-4

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DAP801.......B-2

ERB12-??.....B-2

HA3-2525-5...B-4

HDS01........B-4

TYPE PAGE

HI1-0201-5....B-4
HI1-201HS-5...B-4
HI1-5043-5....B-4

ICL8038BCJD...B-4

LM3046N.......B-5
LM3080N.......B-5
LM317T........B-5
LM337T........B-5

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LT350AK.......B-5

M54517P.......B-5

MC1595L.......B-5
MC74HC74N.....B-5

MS1002-3......B-5

MSM80C85A
-2RS...B-6
MSM82C51ARS...B-6

NE527H........B-7

NJM4558S......B-7
NJM78L??A.....B-7
NJM79L??A.....B-7

QSCH-1754.....B-2

RD??EB?.......B-2

S8054ALB......B-7

SLP155B.......B-2

SN74128N......B-7

SN74ALS04AN...B-7
SN74ALS163AN..B-7
SN74ALS30AN...B-7

SN74HC138N....B-7

TYPE PAGE

SN74LS04N....B-7
SN74LS123N...B-8
SN74LS138N...B-8
SN74LS139N...B-8
SN74LS145N...B-8

SN74LS221N...B-8
SN74LS244N...B-8
SN74LS374N...B-9
SN74LS641N...B-9

SN74S04N.....B-7

SN75150P.....B-9
SN75154N-R...B-9
SN75468N.....B-9

TC4049BP.....B-9

TC40H000P....B-10
TC40H004P....B-10
TC40H027P....B-10
TC40H032P....B-10
TC40H074P....B-10

TC40H138P....B-10
TC40H175P....B-10
TC40H244P....B-10
TC40H245P....B-11
TC40H273P....B-11

TC40H367P....B-11
TC40H368P....B-11
TC40H374P....B-11

TC5564PL-15..B-12

TC74HC00P....B-12
TC74HC02P....B-12
TC74HC04F....B-12
TC74HC04P....B-12
TC74HC08P....B-12

TC74HC123P...B-12
TC74HC138F...B-7
TC74HC14P....B-12
TC74HC147P...B-13
TC74HC153F...B-13

TYPE PAGE

TC74HC157F...B-13
TC74HC163P...B-13
TC74HC174F...B-13
TC74HC175P...B-13
TC74HC237P...B-14

TC74HC240P...B-14
TC74HC244F...B-14
TC74HC244P...B-14
TC74HC245P...B-14
TC74HC32P....B-14

TC74HC373P...B-14
TC74HC374F...B-15
TC74HC374P...B-15
TC74HC4040P..B-15
TC74HC688P...B-15
TC74HC74F....B-5

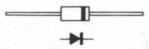
TD62083AP....B-5

TL082CP......B-5
TL084CN......B-16
TL317LP......B-16
TL601CP......B-16

TLR123.......B-2

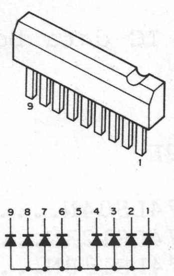
uPC1663C.....B-16
uPC4082C.....B-15
uPC4558C.....B-16
uPC78L05A....B-16

uPD4701AC....B-16
uPD7004C.....B-17
uPD8279C-5...B-17

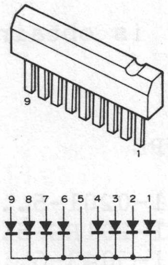


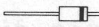
10DF2
10E-2
1S1555
1SS119
1SS133
1SS148
1SS168
ERB12-? ?
QSCH-1754

DAP801


9
1
9 8 7 6 5 4 3 2 1

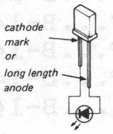
DAN801


9
1
9 8 7 6 5 4 3 2 1

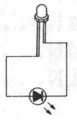


RD ? ?EB ?

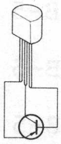
SLP155B ; RED


cathode
mark
or
long length
anode

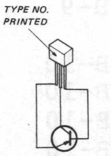
TLR123 ; RED



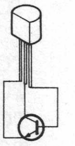
2SA1005
2SA1015
2SA952



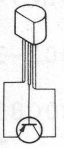
2SA1175


TYPE NO.
PRINTED

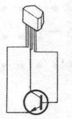
2SC1815



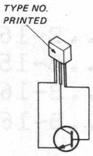
2SA1206



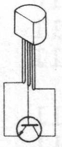
2SC2668



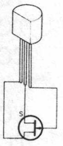
2SC2785
2SC2786


TYPE NO.
PRINTED

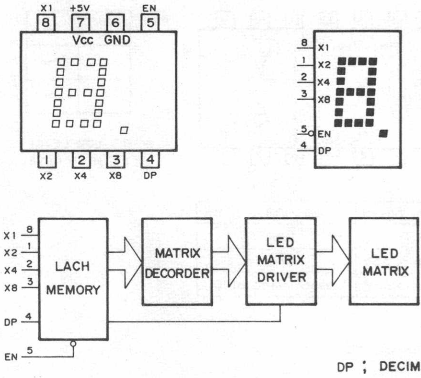
2SC2901



2SK152



5082-7300 (HP)
DECIMAL POINT DISPLAY
— TOP VIEW —

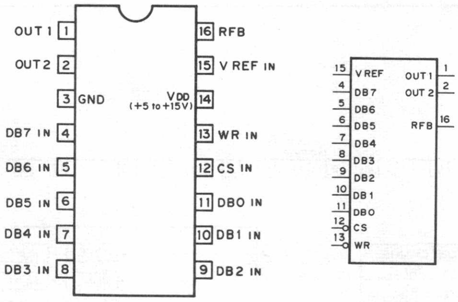

X1
+5V
EN
8
7
6
5
Vcc GND
1
2
3
4
X2
X4
X8
DP
8 X1
1 X2
2 X4
3 X8
5 EN
4 DP
X1 8
X2 1
X4 2
X8 3
LACH MEMORY
MATRIX DECORDER
LED MATRIX DRIVER
LED MATRIX
DP 4
EN 5

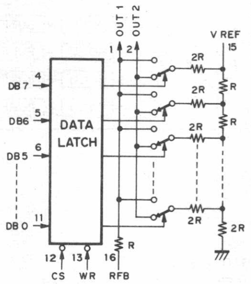
DP ; DECIMAL POINT

INPUTS					DISPLAY	
EN	X8	X4	X2	X1	DP; High level	DP; Low level
0	0	0	0	0	0	0.
0	0	0	0	1	1	1.
0	0	0	1	0	2	2.
0	0	0	1	1	3	3.
0	0	1	0	0	4	4.
0	0	1	0	1	5	5.
0	0	1	1	0	6	6.
0	0	1	1	1	7	7.
0	1	0	0	0	8	8.
0	1	0	0	1	9	9.
0	1	0	1	0	B	B.
0	1	0	1	1	BLANK	.
X	1	1	0	0	BLANK	.
0	1	1	0	1	....	.....
X	1	1	1	X	BLANK	.

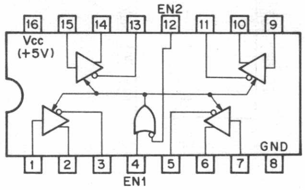
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DONT CARE

AD7524JN (ANALOG DEVICES)
C-MOS 8-BIT BUFFERED MULTIPLYING D/A CONVERTOR
— TOP VIEW —


OUT 1 1
OUT 2 2
3 GND
DB7 IN 4
DB6 IN 5
DB5 IN 6
DB4 IN 7
DB3 IN 8
16 RFB
15 V REF IN
VDD (+5 to +15V) 14
13 WR IN
12 CS IN
11 DB0 IN
10 DB1 IN
9 DB2 IN
15 V REF
4 DB7
5 DB6
6 DB5
7 DB4
8 DB3
9 DB2
10 DB1
11 DB0
12 CS
13 WR
OUT 1 1
OUT 2 2
RFB 16


OUT 1
OUT 2
1
2
V REF
15
DB7 4
DB6 5
DB5 6
DB0 11
DATA LATCH
2R
R
2R
R
2R
2R
2R
R
12 CS
13 WR
16 RFB

AM26LS31CN (TI)
AM26LS31PC (ADVANCED MICRO DEVICE)
HIGH SPEED DIFFERENTIAL LINE DRIVER
— TOP VIEW —

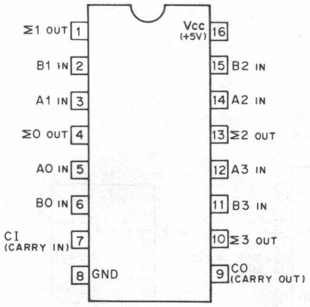

EN2
16
15
14
13
12
11
10
9
Vcc (+5V)
GND
1
2
3
4
5
6
7
8
EN1

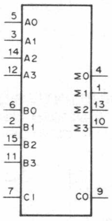
FUNCTION TABLE

EN2	EN1	OUTPUT
0	0	ENABLE
0	1	ENABLE
1	0	HI-Z
1	1	ENABLE

0 ; LOW LEVEL
1 ; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

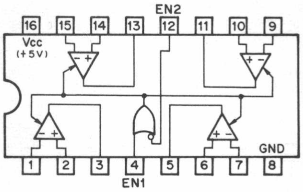
74F283PC (FSC)
TTL 4-BIT BINARY FULL ADDER
— TOP VIEW —


Σ1 OUT 1
B1 IN 2
A1 IN 3
Σ0 OUT 4
A0 IN 5
B0 IN 6
CI (CARRY IN) 7
8 GND
Vcc (+5V) 16
15 B2 IN
14 A2 IN
13 Σ2 OUT
12 A3 IN
11 B3 IN
10 Σ3 OUT
9 CO (CARRY OUT)


5 A0
3 A1
14 A2
12 A3
6 B0
2 B1
15 B2
11 B3
7 CI
Σ0 4
Σ1 1
Σ2 13
Σ3 10
CO 9

	2^4	2^3	2^2	2^1	2^0	DIGIT
					CI	CARRY IN
		A3	A2	A1	A0	DATA A IN
+)		B3	B2	B1	B0	DATA B IN
	CO	Σ3	Σ2	Σ1	Σ0	CARRY& SUM OUT
EX.					1	CI
		1	0	1	1	A
+)		1	0	1	0	B
	1	0	1	1	0	OUTPUTS
	CO	Σ3	Σ2	Σ1	Σ0	

AM26LS32AC (TI)
AM26LS32PC (ADVANCED MICRO DEVICES)
HIGH SPEED DIFFERENTIAL LINE RECEIVER
— TOP VIEW —


EN2
16
15
14
13
12
11
10
9
Vcc (+5V)
GND
1
2
3
4
5
6
7
8
EN1

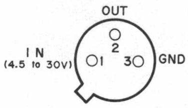
FUNCTION TABLE

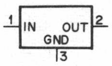
EN2	EN1	OUTPUT
0	0	ENABLE
0	1	ENABLE
1	0	HI-Z
1	1	ENABLE

0; LOW LEVEL
1; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

	SENSE	INPUT VOLT
LS32	±200mV	±7V
LS33	±500mV	±15V

AD580M (ANALOG DEVICES)
REFERENCE VOLTAGE GENERATOR (2.5V)
— BOTTOM VIEW —

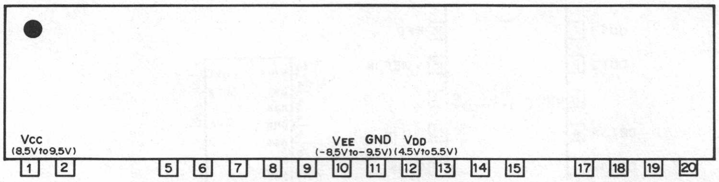

OUT
2
IN (4.5 to 30V)
1
3
GND


1 IN
OUT 2
GND
3

BX1412 (SONY)

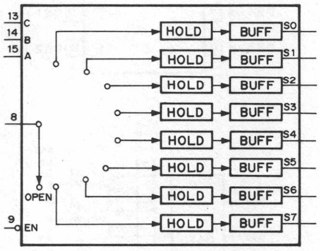
8-CHANNEL SELECTABLE SAMPLE HOLDER

— PRINTED SIDE —


Vcc
(8.5V to 9.5V)
VEE
(-8.5V to -9.5V)
GND
VDD
(4.5V to 5.5V)
1
2
5
6
7
8
9
10
11
12
13
14
15
17
18
19
20

EN	C	B	A	"ON" CHANNEL
0	0	0	0	S0
0	0	0	1	S1
0	0	1	0	S2
0	0	1	1	S3
0	1	0	0	S4
0	1	0	1	S5
0	1	1	0	S6
0	1	1	1	S7
1	X	X	X	OPEN

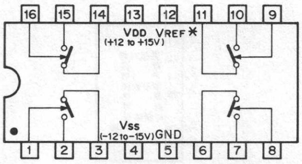
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

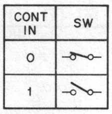

13
C
14
B
15
A
8
OPEN
9
EN
HOLD
BUFF
S0
S1
S2
S3
S4
S5
S6
S7

HI1-0201-5 (HARRIS)

C-MOS ANALOG SWITCH

— TOP VIEW —


16
15
14
13
12
11
10
9
VDD
(+12 to +15V)
VREF*
Vss
(-12 to -15V)
GND
1
2
3
4
5
6
7
8


CONT IN
SW
0
1

0 ; LOW LEVEL
1 ; HIGH LEVEL

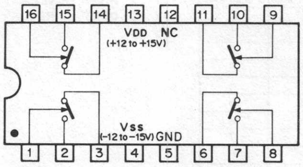
*NOTE

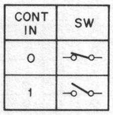
INTERFACIAL DEVICE		VREF CONNECTION
TTL		Open
C-MOS	VDD ≤ 5.5V	Open
	VDD > 5.5V	To VDD of interfacial IC

HI1-201HS (HARRIS)

C-MOS HIGH SPEED ANALOG SWITCH

— TOP VIEW —


16
15
14
13
12
11
10
9
VDD
(+12 to +15V)
NC
Vss
(-12 to -15V)
GND
1
2
3
4
5
6
7
8

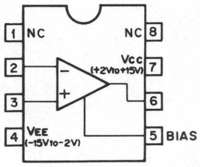

CONT IN
SW
0
1

0 ; LOW LEVEL
1 ; HIGH LEVEL

CA3080E (RCA)

OPERATIONAL AMPLIFIER

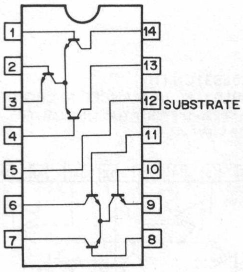
— TOP VIEW —


1
NC
2
3
4
VEE
(-15V to -2V)
NC
8
Vcc
(+2V to +15V)
7
6
5
BIAS

CA3102E-S (RCA)

HIGH FREQ. DIFFERNTIAL AMPLIFIER

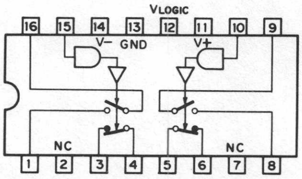
— TOP VIEW —


1
2
3
4
5
6
7
14
13
12
SUBSTRATE
11
10
9
8

HI-5043-5 (HARRIS)

C-MOS ANALOG SWITCH

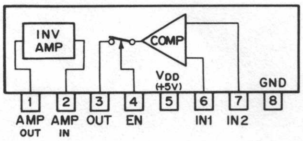
— TOP VIEW —


VLOGIC
16
15
14
13
12
11
10
9
V−
GND
V+
NC
NC
1
2
3
4
5
6
7
8

CX23065 (SONY)

N-MOS PHASE COMPARATOR WITH INVERSION AMPLIFIER

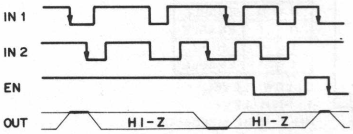
— PRINTED SIDE VIEW —


INV AMP
COMP
VDD
(+5V)
GND
1
2
3
4
5
6
7
8
AMP OUT
AMP IN
OUT
EN
IN1
IN2

EN	OUT
1	ACTIVE
0	HIGH IMPEDANCE

1; HIGH LEVEL
0; LOW LEVEL

TIMMING CHART

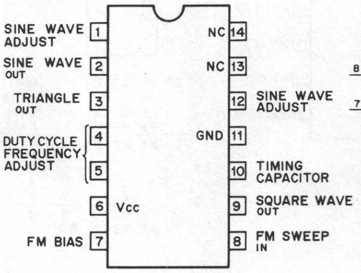


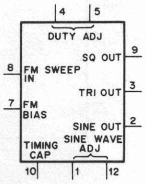
HI-Z ; HI-IMPEDANCE

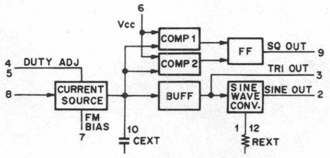
ICL8038BCJD (INTERSIL)

PRECISION WAVEFORM GENERATOR
VOLTAGE CONTROLLED OSCILLATOR

— TOP VIEW —


SINE WAVE ADJUST
1
SINE WAVE OUT
2
TRIANGLE OUT
3
DUTY CYCLE FREQUENCY ADJUST
4
5
6
Vcc
FM BIAS
7
NC
14
NC
13
12
SINE WAVE ADJUST
GND
11
10
TIMING CAPACITOR
9
SQUARE WAVE OUT
8
FM SWEEP IN

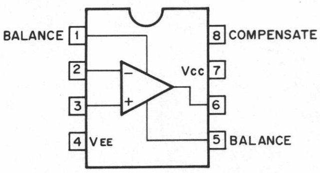

4
5
DUTY ADJ
9
SQ OUT
8
FM SWEEP IN
TRI OUT
3
7
FM BIAS
SINE OUT
2
SINE WAVE ADJ
TIMING CAP
10
1
12


6
Vcc
COMP 1
COMP 2
FF
SQ OUT
9
TRI OUT
3
4
5
DUTY ADJ
8
CURRENT SOURCE
BUFF
SINE WAVE CONV.
SINE OUT
2
FM BIAS
7
10
CEXT
1
12
REXT

HA3-2525-5 (HARRIS)

OPERATIONAL AMPLIFIER

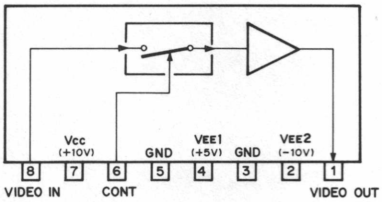
— TOP VIEW —


BALANCE
1
2
3
4
VEE
8
COMPENSATE
Vcc
7
6
5
BALANCE

HDS01 (SOSHIN)

VIDEO AMPLIFIER AND RF SWITCHER

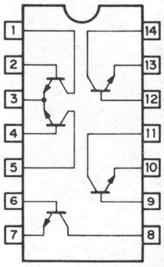
— REAR VIEW —


Vcc
(+10V)
GND
VEE1
(+5V)
GND
VEE2
(-10V)
8
7
6
5
4
3
2
1
VIDEO IN
CONT
VIDEO OUT

LM3046N (NSC)

NPN TRANSISTOR ARRAY

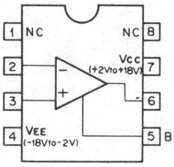
— TOP VIEW —


1
2
3
4
5
6
7
8
9
10
11
12
13
14

LM3080N (RCA)

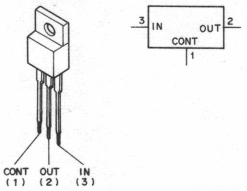
OPERATIONAL AMPLIFIER

— TOP VIEW —


1 NC
2
3
4 VEE (-18V to -2V)
NC 8
Vcc (+2V to +18V) 7
6
5 BIAS

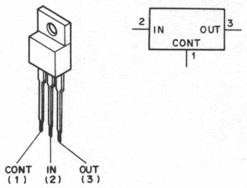
LM317T (NSC)

3-TERMINAL ADJUSTABLE REGULATOR


3 IN
OUT 2
CONT
1
CONT (1)
OUT (2)
IN (3)

LM337T (NSC)

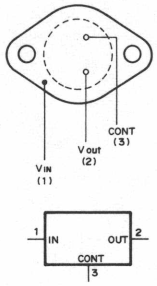
3-TERMINAL ADJUSTABLE REGULATOR NEGATIVE


2 IN
OUT 3
CONT
1
CONT (1)
IN (2)
OUT (3)

LT1033CK (LINEAR TECHNOLOGY)

NEGATIVE ADJUSTABLE REGULATOR (3A)

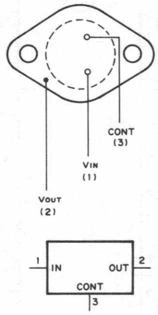
— BOTTOM VIEW —


CONT (3)
Vout (2)
VIN (1)
1 IN
OUT 2
CONT
3

LT350AK (LINEAR TECHNOLOGY)

POSITIVE ADJUSTABLE REGULATOR (3A)

— BOTTOM VIEW —

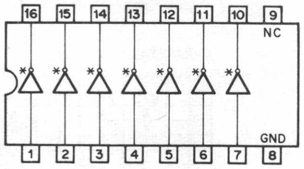

CONT (3)
VIN (1)
VOUT (2)
1 IN
OUT 2
CONT
3

M54517P (MITSUBISHI)

INVERTER WITH OPEN-COLLECTOR

(DARLINGTON-CONNECTED TRANSISTOR ARRAY)

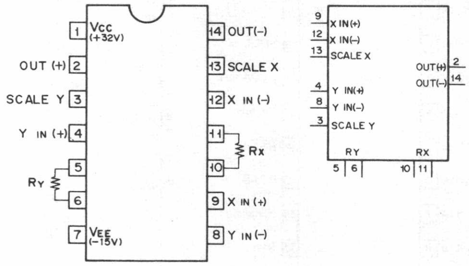
— TOP VIEW —


16
15
14
13
12
11
10
9
NC
GND
1
2
3
4
5
6
7
8

MC1595L (MOTOROLA)

LINEAR MULTIPLIER

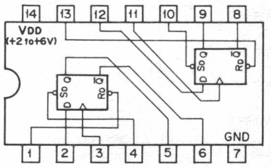
— TOP VIEW —


1 Vcc (+32V)
OUT (+) 2
SCALE Y 3
Y IN (+) 4
5
RY
6
7 VEE (-15V)
14 OUT(-)
13 SCALE X
12 X IN (-)
11
Rx
10
9 X IN (+)
8 Y IN (-)
9 X IN(+)
12 X IN(-)
13 SCALE X
4 Y IN(+)
8 Y IN(-)
3 SCALE Y
OUT(+) 2
OUT(-) 14
RY
RX
5
6
10
11

MC74HC74N (MOTOROLA)
TC74HC74F (TOSHIBA) FLAT PACKAGE

C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET

— TOP VIEW —


14
13
12
11
10
9
8
VDD (+2 to+6V)
GND
1
2
3
4
5
6
7
D
So
Q
Ro
Q̄

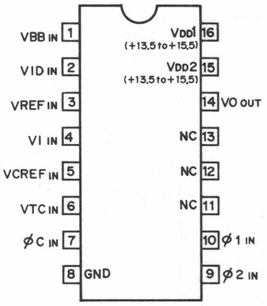
INPUTS				OUTPUTS	
SD	RD	CK	D	Qn+1	$\overline{\text{Qn+1}}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1*	1*
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Qn	$\overline{\text{Qn}}$

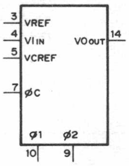
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
1*; NONSTABLE

MS1002-3 (PLESSEY)

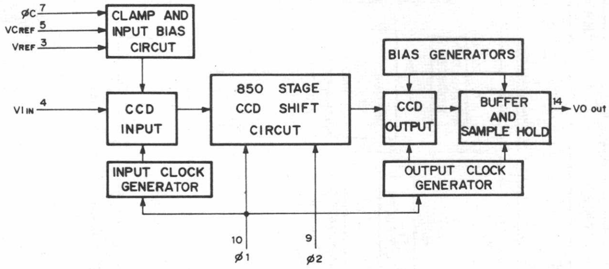
CCD 850 ELEMENT ANALOGUE STORE

— TOP VIEW —


VBB IN 1
VID IN 2
VREF IN 3
VI IN 4
VCREF IN 5
VTC IN 6
ØC IN 7
8 GND
VDD1 (+13.5 to +15.5) 16
VDD2 (+13.5 to +15.5) 15
14 VO OUT
NC 13
NC 12
NC 11
10 Ø1 IN
9 Ø2 IN

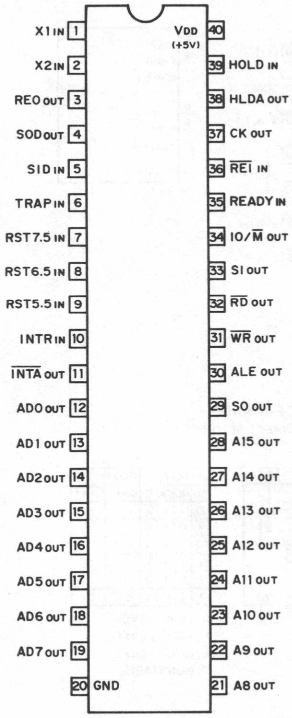

3 VREF
4 VIN
5 VCREF
VO OUT 14
7 ØC
Ø1
Ø2
10
9

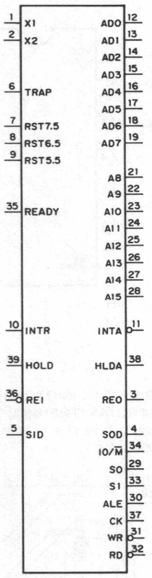
VO ; ANALOGUE OUTPUT
ØC ; CLAMP PULSE
Ø1 ; CLOCK 1
Ø2 ; CLOCK 2
VBB ; SUBSTRATE BIAS
VID ; INTERNAL DIODE BIAS
VREF ; REFERENCE INPUT
VI ; ANALOGUE INPUT
VCREF ; CLAMP REFERENCE BIAS
VTC ; THERMAL COMPENSATION BIAS


ØC 7
VCREF 5
VREF 3
CLAMP AND INPUT BIAS CIRCUT
VIN 4
CCD INPUT
850 STAGE CCD SHIFT CIRCUIT
BIAS GENERATORS
CCD OUTPUT
BUFFER AND SAMPLE HOLD
14 VO out
INPUT CLOCK GENERATOR
OUTPUT CLOCK GENERATOR
10 Ø1
9 Ø2

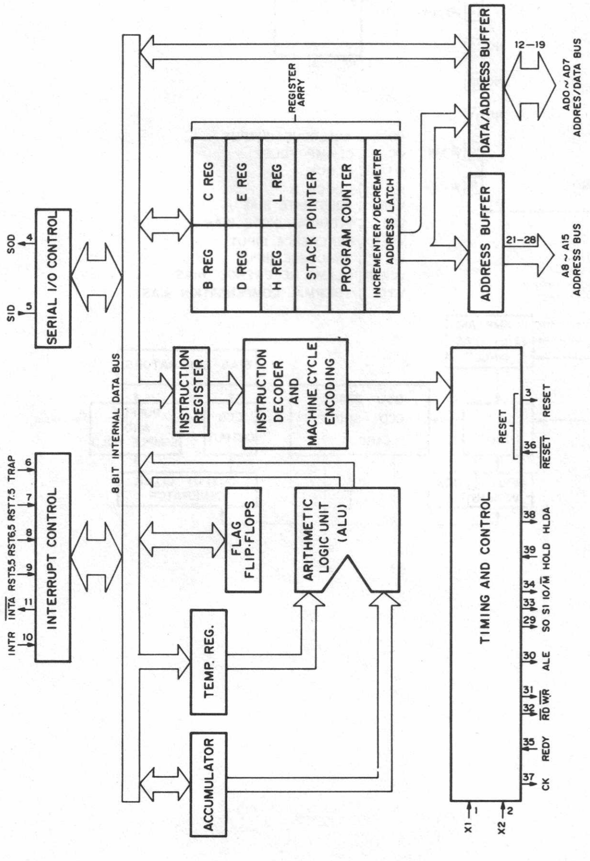
MSM80C85A-2RS (OKI)

C-MOS 1 CHIP 8-BIT MICROPROCESSOR
— TOP VIEW —


X1 IN 1
X2 IN 2
REO OUT 3
SOD OUT 4
SID IN 5
TRAP IN 6
RST7.5 IN 7
RST6.5 IN 8
RST5.5 IN 9
INTR IN 10
INTA OUT 11
AD0 OUT 12
AD1 OUT 13
AD2 OUT 14
AD3 OUT 15
AD4 OUT 16
AD5 OUT 17
AD6 OUT 18
AD7 OUT 19
20 GND
40 VDD (+5V)
39 HOLD IN
38 HLDA OUT
37 CK OUT
36 REI IN
35 READY IN
34 IO/M OUT
33 S1 OUT
32 RD OUT
31 WR OUT
30 ALE OUT
29 S0 OUT
28 A15 OUT
27 A14 OUT
26 A13 OUT
25 A12 OUT
24 A11 OUT
23 A10 OUT
22 A9 OUT
21 A8 OUT

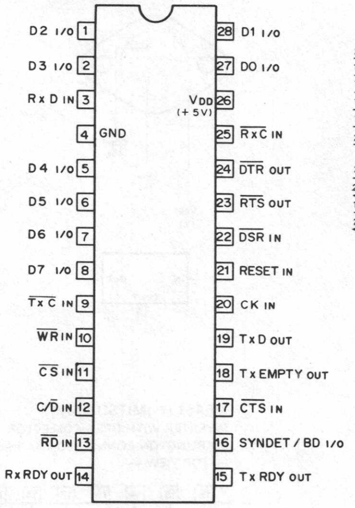

1 X1
2 X2
6 TRAP
7 RST7.5
8 RST6.5
9 RST5.5
35 READY
10 INTR
39 HOLD
36 REI
5 SID
AD0 12
AD1 13
AD2 14
AD3 15
AD4 16
AD5 17
AD6 18
AD7 19
A8 21
A9 22
A10 23
A11 24
A12 25
A13 26
A14 27
A15 28
INTA 11
HLDA 38
REO 3
SOD 4
IO/M 34
S0 29
S1 33
ALE 30
CK 37
WR 31
RD 32

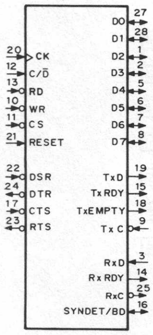
X1,2 ; CRYSTAL INPUT
A8~A15 ; ADDRESS BUS
AD0~AD7 ; MALTIPLEXED ADDRES/DATA BUS
ALE ; ADDRESS LUTCH ENABLE
WR ; WRITE CONTROL
RD ; READ CONTROL
INTR ; INTERRUPT REQUEST
RST7.5,6.5,5.5 ; RESTART INTERRUPT
S0,S1,IO/M ; MACHINE CYCLE STATUS
TRAP ; TRAP INTERRUPT INPUT
READY ; READY SIGNAL INPUT
SID ; SERIAL INPUT DATA LINE
SOD ; SERIAL OUTPUT DATA LINE
REI ; RESET INPUT
REO ; RESET OUTPUT
HOLA ; HOLD ACKNOWLEDGE
INTA ; INTERRUPT ACKNOWLEDGE


DATA/ADDRESS BUFFER
12~19
AD0 ~ AD7 ADDRESS/DATA BUS
REGISTER ARRY
C REG
E REG
L REG
B REG
D REG
H REG
STACK POINTER
PROGRAM COUNTER
INCREMENTER/DECREMETER ADDRESS LATCH
ADDRESS BUFFER
21~28
A8 ~ A15 ADDRESS BUS
SOD 4
SID 5
SERIAL I/O CONTROL
8 BIT INTERNAL DATA BUS
INSTRUCTION REGISTER
INSTRUCTION DECODER AND MACHINE CYCLE ENCODING
TRAP 6
RST7.5 7
RST6.5 8
RST5.5 9
INTA 11
INTR 10
INTERRUPT CONTROL
FLAG FLIP-FLOPS
ARITHMETIC LOGIC UNIT (ALU)
TEMP. REG.
ACCUMULATOR
TIMING AND CONTROL
RESET
3 RESET
36 RESET
38 HLDA
39 HOLD
34 IO/M
33 S1
29 S0
30 ALE
31 WR
32 RD
35 READY
37 CK
X1 1
X2 2

MSM82C51ARS (OKI)

C-MOS PROGRAMMABLE COMMUNICATION INTERFACE
— TOP VIEW —

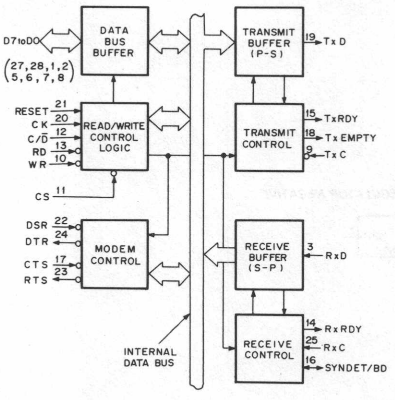

D2 I/O 1
D3 I/O 2
RxD IN 3
4 GND
D4 I/O 5
D5 I/O 6
D6 I/O 7
D7 I/O 8
TxC IN 9
WR IN 10
CS IN 11
C/D IN 12
RD IN 13
RxRDY OUT 14
28 D1 I/O
27 D0 I/O
26 VDD (+5V)
25 RxC IN
24 DTR OUT
23 RTS OUT
22 DSR IN
21 RESET IN
20 CK IN
19 TxD OUT
18 TxEMPTY OUT
17 CTS IN
16 SYNDET / BD I/O
15 TxRDY OUT


20 CK
12 C/D
13 RD
10 WR
11 CS
21 RESET
22 DSR
24 DTR
17 CTS
23 RTS
D0 27
D1 28
D2 1
D3 2
D4 5
D5 6
D6 7
D7 8
TxD 19
TxRDY 15
TxEMPTY 18
TxC 9
RxD 3
RxRDY 14
RxC 25
SYNDET/BD 16

OPERATION WITH CPU

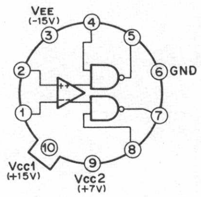
$\overline{CS}$	C/$\overline{D}$	$\overline{RD}$	$\overline{WR}$	FUNCTION
1	X	X	X	DATA BUS 3-STATE
0	X	1	1	DATA BUS 3-STATE
0	1	0	1	STATUS TO CPU
0	1	1	0	CONTROL WORD FROM CPU
0	0	0	1	DATA TO CPU
0	0	1	0	DATA FROM CPU

1 ; HIGH LEVEL
0 ; LOW LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

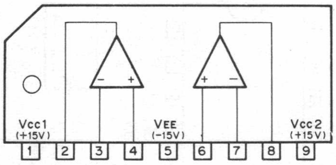

D7 to D0
(27,28,1,2 5,6,7,8)
DATA BUS BUFFER
RESET 21
CK 20
C/D 12
RD 13
WR 10
READ/WRITE CONTROL LOGIC
CS 11
DSR 22
DTR 24
CTS 17
RTS 23
MODEM CONTROL
INTERNAL DATA BUS
TRANSMIT BUFFER (P-S)
19 TxD
TRANSMIT CONTROL
15 TxRDY
18 TxEMPTY
9 TxC
RECEIVE BUFFER (S-P)
3 RxD
RECEIVE CONTROL
14 RxRDY
25 RxC
16 SYNDET/BD

CK; CLOCK SIGNAL
CS; CHIP ENABLE
CTS; CLEAR TO SEND DATA
C/D; DATA,COMMAND WORD or STATUS WORD IS TO BE WRITTEN or READ
D0 TO D7; DATA
DSR; DATA SET READY
DTR; DATA TERMINAL READY
RD; READ DATA or STATUS WORD
RESET; RESET BY HIGH LEVEL
RTS; REQUEST TO SEND DATA
RxC; RECEIVING CLOCK
RxD; RECEIVING DATA
RxRDY; RECEIVING READY
SYNDET/BD; SYNC DETECT/BREAK DETECT
TxC; TRANSMITTING CLOCK
TxD; TRANSMITTING DATA
TxEMPTY; TRANSMITTING CHARACTER EMPTY
TxRDY; TRANSMITTING READY
WR; WRITE DATA or CONTROL WORD

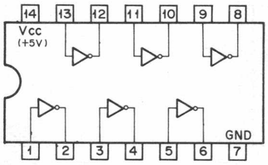
NE527H (SIGNETICS)
VOLTAGE COMPARATOR
— BOTTOM VIEW —

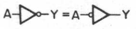

VEE (-15V) 3
4
5
6 GND
2
1
7
8
9 Vcc2 (+7V)
10
Vcc1 (+15V)

NJM4558S (JRC)
HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER
— SIDE VIEW —


Vcc1 (+15V)
VEE (-15V)
Vcc2 (+15V)
1
2
3
4
5
6
7
8
9

SN74ALS04AN (TI)
SN74LS04N (TI)
SN74S04N (TI)
TTL INVERTER
— TOP VIEW —


14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7

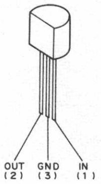


$Y=\overline{A}$

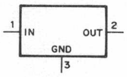
A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

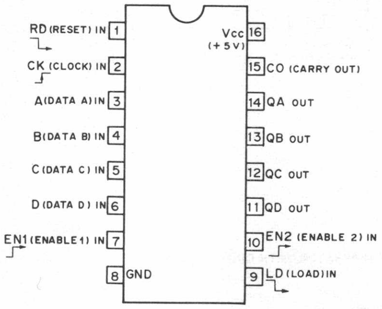
NJM78L ? ?A (NEC)
POSITIVE VOLTAGE REGULATOR (100mA)

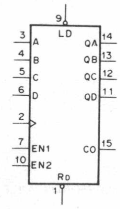

OUT (2)
GND (3)
IN (1)

OUTPUT VOLTAGE	NJM78L??A	uA78L??ACL	uA78L??AWV	uPC78L??J
2.6V	NJM78L02A	uA78L02ACL	uA78L26AWV	
5V	NJM78L05A	uA78L05ACL	uA78L05AWV	uPC78L05J
6V	NJM78L06A			
6.2V		uA78L06ACL	uA78L62AWV	
8V	NJM78L08A	uA78L08ACL		uPC78L08J
8.2V			uA78L82AWV	
9V	NJM78L09A	uA78L09ACL	uA78L09AWV	
10V		uA78L10ACL		uPC78L10J
12V	NJM78L12A	uA78L12ACL	uA78L12AWV	uPC78L12J
15V	NJM78L15A	uA78L15ACL	uA78L15AWV	uPC78L15J
18V	NJM78L18A		uA78L18AWV	
20V	NJM78L20A			
24V	NJM78L24A		uA78L24AWV	


1
IN
OUT
2
GND
3

SN74ALS163AN (TI)
TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
— TOP VIEW —


RD (RESET) IN 1
CK (CLOCK) IN 2
A (DATA A) IN 3
B (DATA B) IN 4
C (DATA C) IN 5
D (DATA D) IN 6
EN1 (ENABLE 1) IN 7
8 GND
Vcc (+5V) 16
15 CO (CARRY OUT)
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 (ENABLE 2) IN
9 LD (LOAD) IN


9
LD
3 A
4 B
5 C
6 D
2
7 EN1
10 EN2
RD
1
QA 14
QB 13
QC 12
QD 11
CO 15

MODE SELECTION

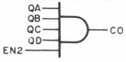
CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

COUNT SEQUENCE

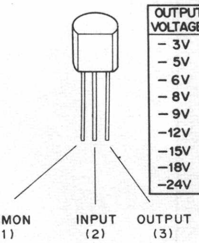
COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

CARRY OUTPUT "CO"

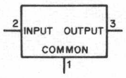

QA
QB
QC
QD
EN2
CO

CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

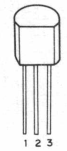
NJM79L ? ?A (JRC)
NEGATIVE VOLTAGE REGULATOR (100mA)
— FRONT VIEW —


COMMON (1)
INPUT (2)
OUTPUT (3)

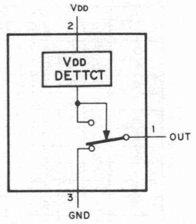
OUTPUT VOLTAGE	??
– 3V	03
– 5V	05
– 6V	06
– 8V	08
– 9V	09
–12V	12
–15V	15
–18V	18
–24V	24


2
INPUT
OUTPUT
3
COMMON
1

S8054ALB (DAINI SEIKOSHA)
C-MOS VOLTAGE DETECTOR
— FRONT VIEW —



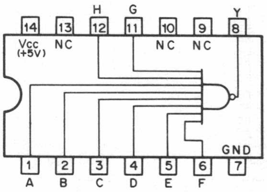
1. OUT
2. VDD
3. GND

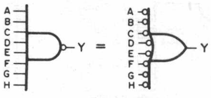

VDD
2
VDD DETTCT
1
OUT
3
GND

VDD DETTCT SELECTION

VDD	OUT
VDD > 4.305V	VDD
VDD < 3.995V	GND

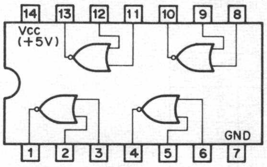
SN74ALS30AN (TI)
TTL 8-INPUT POSITIVE-NAND GATE
— TOP VIEW —

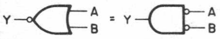

H
G
Y
14
13
12
11
10
9
8
Vcc (+5V)
NC
NC
NC
GND
1
2
3
4
5
6
7
A
B
C
D
E
F


A
B
C
D
E
F
G
H
Y
=
A
B
C
D
E
F
G
H
Y

$Y=\overline{A\cdot B\cdot C\cdot D\cdot E\cdot F\cdot G\cdot H}$
$=\overline{A}+\overline{B}+\overline{C}+----+\overline{H}$

SN74128N (TI)
TTL 50-OHM LINE DRIVER
— TOP VIEW —

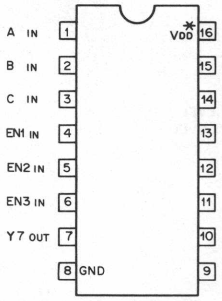

14
13
12
11
10
9
8
Vcc (+5V)
GND
1
2
3
4
5
6
7



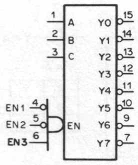
$Y=\overline{A+B}=\overline{A}\cdot\overline{B}$

SN74HC138N (TI)
TC74HC138F (TOSHIBA) FLAT PACKAGE

C-MOS 3-TO-8 LINE DECODER/DEMULTIPLEXER
— TOP VIEW —


A IN 1
B IN 2
C IN 3
EN1 IN 4
EN2 IN 5
EN3 IN 6
Y7 OUT 7
8 GND
VDD * 16
15 Y0 OUT
14 Y1 OUT
13 Y2 OUT
12 Y3 OUT
11 Y4 OUT
10 Y5 OUT
9 Y6 OUT

* VDD HC ; +2 to +6V
HCT; +5V


1 A
2 B
3 C
EN1 4
EN2 5
EN3 6
EN
Y0 15
Y1 14
Y2 13
Y3 12
Y4 11
Y5 10
Y6 9
Y7 7

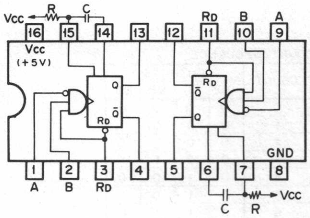
INPUT				OUTPUT							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

$EN = \overline{EN1} \cdot \overline{EN2} \cdot EN3$

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

SN74LS123N (TI)

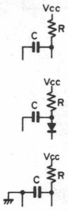
TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
— TOP VIEW —


Vcc
R
C
RD
B
A
16
15
14
13
12
11
10
9
Vcc (+5V)
Q
RD
Q̄
Q̄
RD
Q
GND
1
2
3
4
5
6
7
8
A
B
RD
C
R
Vcc

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH


Vcc
R
C
Vcc
R
C
Vcc
R
C

'123 ; $T_W = 0.28\left(1+\frac{700}{R}\right)CR$

'L123; $T_W = 0.33\left(1+\frac{700}{R}\right)CR$

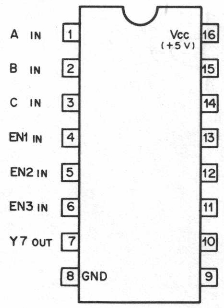
'123 ; $T_W = 0.25\left(1+\frac{700}{R}\right)CR$

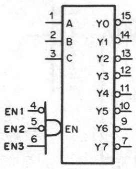
'L123; $T_W = 0.29\left(1+\frac{700}{R}\right)CR$

'LS123; $T_W = 0.45CR$

SN74LS138N (TI)

TTL 3-TO-8-LINE DECODER/DEMULTIPLEXER
— TOP VIEW —


A IN 1
B IN 2
C IN 3
EN1 IN 4
EN2 IN 5
EN3 IN 6
Y7 OUT 7
8 GND
Vcc (+5V) 16
15 Y0 OUT
14 Y1 OUT
13 Y2 OUT
12 Y3 OUT
11 Y4 OUT
10 Y5 OUT
9 Y6 OUT


1 A
2 B
3 C
EN1 4
EN2 5
EN3 6
EN
Y0 15
Y1 14
Y2 13
Y3 12
Y4 11
Y5 10
Y6 9
Y7 7

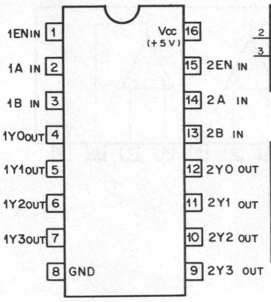
INPUTS				OUTPUTS							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

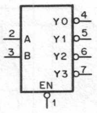
$EN = \overline{EN1} \cdot \overline{EN2} \cdot EN3$

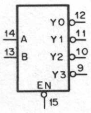
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

SN74LS139N (TI)

TTL 2-TO-4-LINE DECODER/DEMULTIPLEXER
— TOP VIEW —


1EN IN 1
1A IN 2
1B IN 3
1Y0 OUT 4
1Y1 OUT 5
1Y2 OUT 6
1Y3 OUT 7
8 GND
Vcc (+5V) 16
15 2EN IN
14 2A IN
13 2B IN
12 2Y0 OUT
11 2Y1 OUT
10 2Y2 OUT
9 2Y3 OUT


2 A
3 B
EN
1
Y0 4
Y1 5
Y2 6
Y3 7

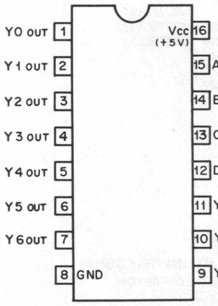

14 A
13 B
EN
15
Y0 12
Y1 11
Y2 10
Y3 9

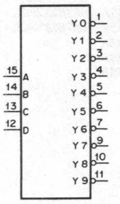
INPUTS			OUTPUTS			
EN	B	A	Y3	Y2	Y1	Y0
0	0	0	1	1	1	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	0	1	1	1
1	X	X	1	1	1	1

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

SN74LS145N (TI)

TTL BCD-TO-DECIMAL DECODER/DRIVER
— TOP VIEW —


Y0 OUT 1
Y1 OUT 2
Y2 OUT 3
Y3 OUT 4
Y4 OUT 5
Y5 OUT 6
Y6 OUT 7
8 GND
Vcc (+5V) 16
15 A IN
14 B IN
13 C IN
12 D IN
11 Y9 OUT
10 Y8 OUT
9 Y7 OUT

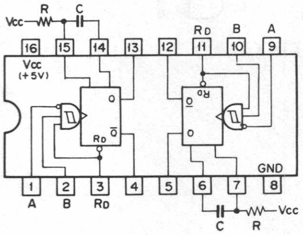

15 A
14 B
13 C
12 D
Y0 1
Y1 2
Y2 3
Y3 4
Y4 5
Y5 6
Y6 7
Y7 9
Y8 10
Y9 11

STATE	INPUTS				OUTPUTS									
	D	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
1	0	0	0	1	1	0	1	1	1	1	1	1	1	1
2	0	0	1	0	1	1	0	1	1	1	1	1	1	1
3	0	0	1	1	1	1	1	0	1	1	1	1	1	1
4	0	1	0	0	1	1	1	1	0	1	1	1	1	1
5	0	1	0	1	1	1	1	1	1	0	1	1	1	1
6	0	1	1	0	1	1	1	1	1	1	0	1	1	1
7	0	1	1	1	1	1	1	1	1	1	1	0	1	1
8	1	0	0	0	1	1	1	1	1	1	1	1	0	1
9	1	0	0	1	1	1	1	1	1	1	1	1	1	0
INVALID	1	0	1	0	1	1	1	1	1	1	1	1	1	1
	1	0	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	0	0	1	1	1	1	1	1	1	1	1	1
	1	1	0	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	0	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1

0; LOW LEVEL
1; HIGH LEVEL

SN74LS221N (TI)

TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
— TOP VIEW —


R
C
Vcc
RD
B
A
16
15
14
13
12
11
10
9
Vcc (+5V)
Q
RD
Q̄
RD
Q̄
Q
GND
1
2
3
4
5
6
7
8
A
B
RD
C
R
Vcc

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

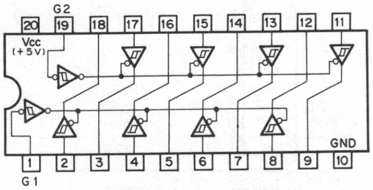
0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE

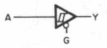
OUTPUT PULSE WIDTH = 0.7CR

SN74LS244N (TI)

TTL 3-STATE SCHMITT TRIGGER BUFFER/DRIVER

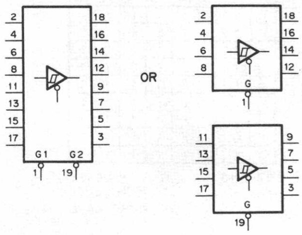
— TOP VIEW —


G2
20
19
18
17
16
15
14
13
12
11
Vcc
(+5V)
GND
1
2
3
4
5
6
7
8
9
10
G1



G	A	Y
0	0	0
0	1	1
1	X	HI-Z

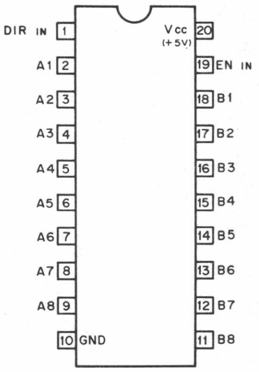
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE


2
4
6
8
11
13
15
17
18
16
14
12
9
7
5
3
G1
G2
1
19
OR
G
1
G
19

SN74LS641N (TI)

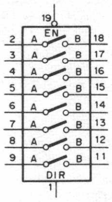
TTL BILATERAL SCHMITT TRIGGER BUS TRANSCEIVERS WITH 3-STATE OUTPUT

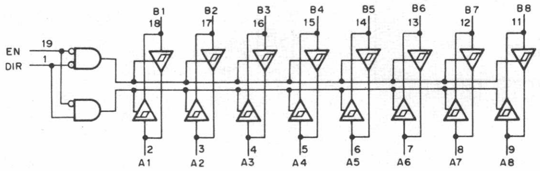
— TOP VIEW —


DIR IN 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
10 GND
Vcc 20
(+5V)
19 EN IN
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8

EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.
HI-Z; HIGH IMPEDANCE

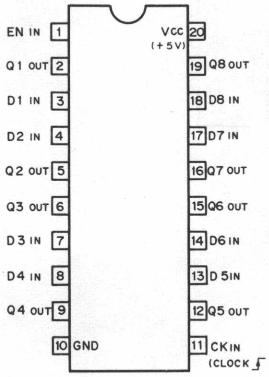

19
EN
A
B
DIR
1

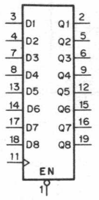

B1
B2
B3
B4
B5
B6
B7
B8
EN
DIR
19
1
A1
A2
A3
A4
A5
A6
A7
A8

SN74LS374N (TI)

TTL 3-STATE OUTPUTS OCTAL D-TYPE FLIP-FLOP

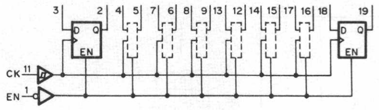
— TOP VIEW —


EN IN 1
Q1 OUT 2
D1 IN 3
D2 IN 4
Q2 OUT 5
Q3 OUT 6
D3 IN 7
D4 IN 8
Q4 OUT 9
10 GND
Vcc 20
(+5V)
19 Q8 OUT
18 D8 IN
17 D7 IN
16 Q7 OUT
15 Q6 OUT
14 D6 IN
13 D5 IN
12 Q5 OUT
11 CK IN
(CLOCK ↑)


D1
D2
D3
D4
D5
D6
D7
D8
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
EN
1

INPUTS			OUT
EN	D	CK	Q
0	1	↑	1
0	0	↑	0
0	X	0	Qo
1	X	X	HI-Z

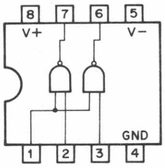
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE


3
2
4
5
7
6
8
9
13
12
14
15
17
16
18
19
D
Q
EN
CK
11
EN
1

SN75150P (TI)

DUAL LINE DRIVER

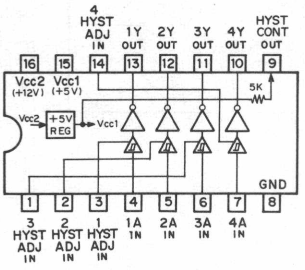
— TOP VIEW —


8
7
6
5
V+
V−
GND
1
2
3
4

SN75154N (TI)

QUADRUPLE LINE RECEIVER

— TOP VIEW —


4 HYST ADJ IN
1Y OUT
2Y OUT
3Y OUT
4Y OUT
HYST CONT OUT
16
15
14
13
12
11
10
9
Vcc2 (+12V)
Vcc1 (+5V)
5K
Vcc2
+5V REG
Vcc1
GND
1
2
3
4
5
6
7
8
3 HYST ADJ IN
2 HYST ADJ IN
1 HYST ADJ IN
1A IN
2A IN
3A IN
4A IN

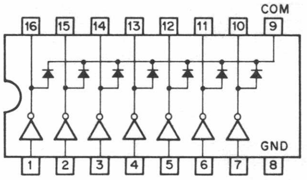
MODE SELECTION

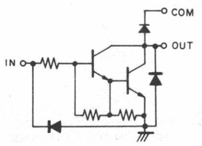
Vcc2	Vcc 1	HYST ADJ	HYST CONT	MODE
+12V	HYST ADJ	Vcc1(+5V)	OPEN	NORMAL
+12V	OPEN	OPEN	OPEN	FAIL SAFE
+12V	OPEN	HYST CONT	HYST ADJ	NORMAL
OPEN	+5V	Vcc1	OPEN	NORMAL
OPEN	+5V	OPEN	OPEN	FAIL SAFE
OPEN	+5V	OPEN	Vcc1	NORMAL

SN75468N (TI)

DARLINGTON TRANSISTOR ARRAY

— TOP VIEW —

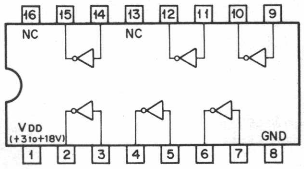

COM
16
15
14
13
12
11
10
9
GND
1
2
3
4
5
6
7
8

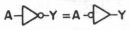


TC4049BP (TOSHIBA)

C-MOS INVERTING TYPE BUFFER/CONVERTER

— TOP VIEW —


16
15
14
13
12
11
10
9
NC
NC
VDD
(+3 to +18V)
GND
1
2
3
4
5
6
7
8



$Y = \overline{A}$

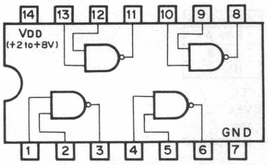
A	Y
0	1
1	0

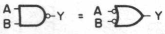
0; LOW LEVEL
1; HIGH LEVEL

TC40H000P (TOSHIBA)

C-MOS 2-INPUT NAND GATE

— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7



$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

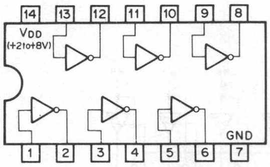
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

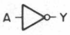
0; LOW LEVEL
1; HIGH LEVEL

TC40H004P (TOSHIBA)

C-MOS INVERTER

— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7



$Y = \overline{A}$

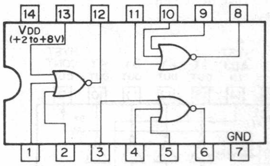
A	Y
0	1
1	0

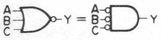
0; LOW LEVEL
1; HIGH LEVEL

TC40H027P (TOSHIBA)

C-MOS 3-INPUT POSITIVE-NOR GATE

— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7



$Y = \overline{A + B + C} = \overline{A} \cdot \overline{B} \cdot \overline{C}$

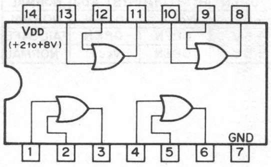
A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

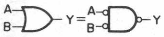
0; LOW LEVEL
1; HIGH LEVEL

TC40H032P (TOSHIBA)

C-MOS 2-INPUT POSITIVE-OR GATE

— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7



$Y = A + B = \overline{\overline{A} \cdot \overline{B}}$

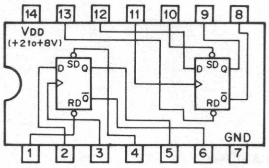
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

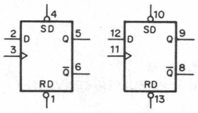
0; LOW LEVEL
1; HIGH LEVEL

TC40H074P (TOSHIBA)

C-MOS HIGH SPEED D-TYPE FLIP-FLOP WITH DIRECT SET/RESET

— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +8V)
D
SD
Q
RD
Q̄
GND
1
2
3
4
5
6
7


4
2
3
D
SD
Q
5
Q̄
6
RD
1
10
12
11
D
SD
Q
9
Q̄
8
RD
13

D-MODE

tn	tn + 1	
D	Q	$\overline{Q}$
0	0	1
1	1	0

R-S MODE

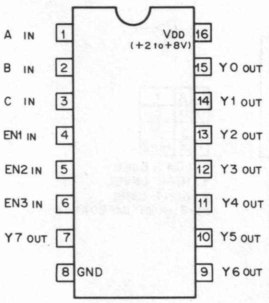
INPUT		OUTPUT	
RD	SD	Q	$\overline{Q}$
0	0	1	1
0	1	0	1
1	0	1	0
1	1	D-MODE	

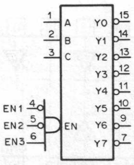
0; LOW LEVEL
1; HIGH LEVEL

TC40H138P (TOSHIBA)

C-MOS 3-TO-8-LINE DECODER/DEMULTIPLEXER

— TOP VIEW —


A IN 1
B IN 2
C IN 3
EN1 IN 4
EN2 IN 5
EN3 IN 6
Y7 OUT 7
8 GND
VDD (+2 to +8V) 16
15 Y0 OUT
14 Y1 OUT
13 Y2 OUT
12 Y3 OUT
11 Y4 OUT
10 Y5 OUT
9 Y6 OUT


1 A
2 B
3 C
EN1 4
EN2 5
EN3 6
EN
Y0 15
Y1 14
Y2 13
Y3 12
Y4 11
Y5 10
Y6 9
Y7 7

INPUTS				OUTPUTS							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

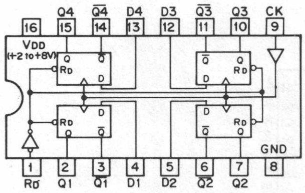
$EN = \overline{EN1} \cdot \overline{EN2} \cdot EN3$

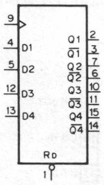
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC40H175P (TOSHIBA)

C-MOS D-TYPE FLIP-FLOP WITH CLEAR

— TOP VIEW —


Q4
Q̄4
D4
D3
Q̄3
Q3
CK
16
15
14
13
12
11
10
9
VDD
(+2 to +8V)
Q
Q̄
RD
D
GND
1
2
3
4
5
6
7
8
RD
Q1
Q̄1
D1
D2
Q̄2
Q2


9
4 D1
5 D2
12 D3
13 D4
Q1 2
Q̄1 3
Q2 7
Q̄2 6
Q3 10
Q̄3 11
Q4 15
Q̄4 14
RD
1

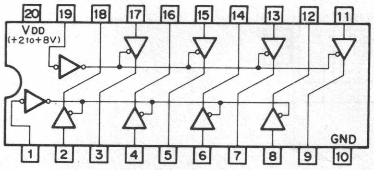
RD	CK	D	Q	$\overline{Q}$
0	X	X	0	1
1	↑	1	1	0
1	↑	0	0	1
1	0	X	Q_0	$\overline{Q}_0$

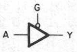
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC40H244P (TOSHIBA)

C-MOS 3-STATE BUFFER/DRIVER

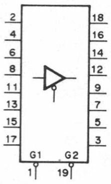
— TOP VIEW —


20
19
18
17
16
15
14
13
12
11
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7
8
9
10

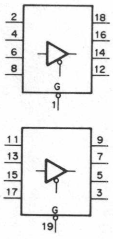


G	A	Y
0	0	0
0	1	1
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE


2
4
6
8
11
13
15
17
18
16
14
12
9
7
5
3
G1
G2
1
19

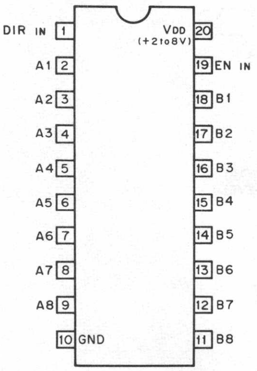
OR


2
4
6
8
18
16
14
12
G
1
11
13
15
17
9
7
5
3
G
19

TC40H245P (TOSHIBA)

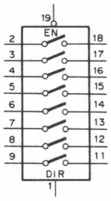
C-MOS BILATERAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT

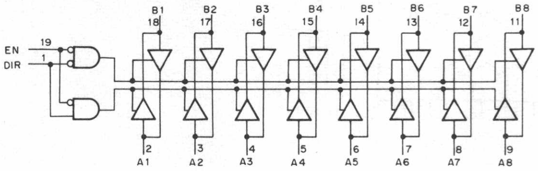
— TOP VIEW —


DIR IN 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
10 GND
VDD (+2 to 8V) 20
19 EN IN
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8

EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.

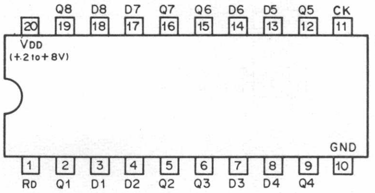

19
EN
2
3
4
5
6
7
8
9
18
17
16
15
14
13
12
11
DIR
1

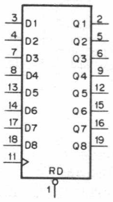

EN
19
DIR
1
B1 18
B2 17
B3 16
B4 15
B5 14
B6 13
B7 12
B8 11
2 A1
3 A2
4 A3
5 A4
6 A5
7 A6
8 A7
9 A8

TC40H273P (TOSHIBA)

C-MOS D-TYPE FLIP-FLOP WITH DIRECT RESET

— TOP VIEW —

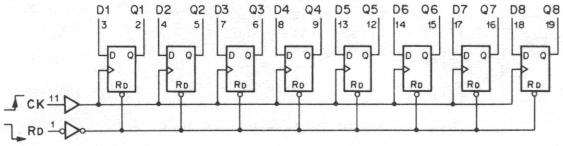

Q8 D8 D7 Q7 Q6 D6 D5 Q5 CK
20 19 18 17 16 15 14 13 12 11
VDD (+2 to +8V)
GND
1 2 3 4 5 6 7 8 9 10
RD Q1 D1 D2 Q2 Q3 D3 D4 Q4


3 D1 Q1 2
4 D2 Q2 5
7 D3 Q3 6
8 D4 Q4 9
13 D5 Q5 12
14 D6 Q6 15
17 D7 Q7 16
18 D8 Q8 19
11
RD
1

EACH FLIP-FLOP

INPUTS			OUT
RD	CK	D	Q
0	X	X	0
1	⎍	0	0
1	⎍	1	1
1	0	X	Qo

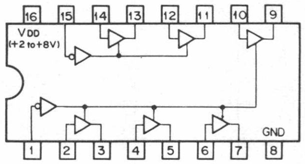
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

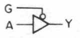

D1 Q1 D2 Q2 D3 Q3 D4 Q4 D5 Q5 D6 Q6 D7 Q7 D8 Q8
3 2 4 5 7 6 8 9 13 12 14 15 17 16 18 19
D Q
RD
CK 11
RD 1

TC40H367P (TOSHIBA)

C-MOS BUS DRIVER WITH 3-STATE OUTPUTS

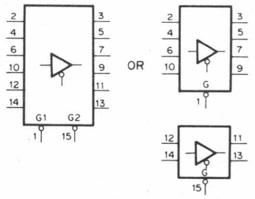
— TOP VIEW —


16 15 14 13 12 11 10 9
VDD (+2 to +8V)
GND
1 2 3 4 5 6 7 8



G	A	Y
0	0	0
0	1	1
1	X	HI-Z

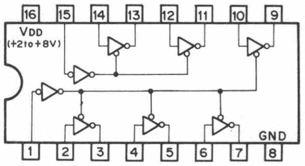
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

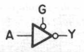

2
4
6
10
12
14
3
5
7
9
11
13
G1 G2
1 15
OR
2
4
6
10
3
5
7
9
G
1
12
14
11
13
G
15

TC40H368P (TOSHIBA)

C-MOS INVERTING 3-STATE BUFFER

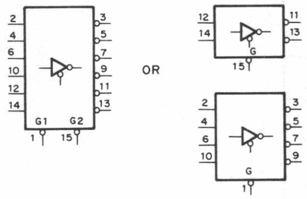
— TOP VIEW —


16 15 14 13 12 11 10 9
VDD (+2 to +8V)
GND
1 2 3 4 5 6 7 8



G	A	Y
0	0	1
0	1	0
1	X	HI-Z

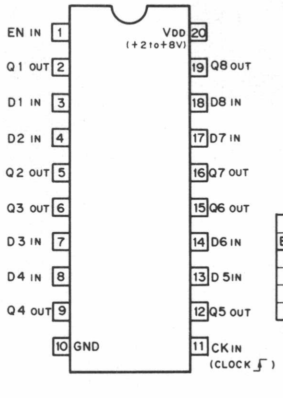
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

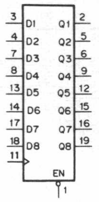

2
4
6
10
12
14
3
5
7
9
11
13
G1 G2
1 15
OR
12
14
11
13
G
15
2
4
6
10
3
5
7
9
G
1

TC40H374P (TOSHIBA)

C-MOS 3-STATE OUTPUTS OCTAL D-TYPE FLIP-FLOP

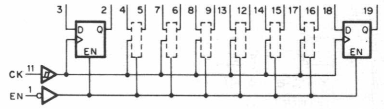
— TOP VIEW —


EN IN 1
Q1 OUT 2
D1 IN 3
D2 IN 4
Q2 OUT 5
Q3 OUT 6
D3 IN 7
D4 IN 8
Q4 OUT 9
10 GND
VDD (+2 to +8V) 20
19 Q8 OUT
18 D8 IN
17 D7 IN
16 Q7 OUT
15 Q6 OUT
14 D6 IN
13 D5 IN
12 Q5 OUT
11 CK IN (CLOCK ⎍)


3 D1 Q1 2
4 D2 Q2 5
7 D3 Q3 6
8 D4 Q4 9
13 D5 Q5 12
14 D6 Q6 15
17 D7 Q7 16
18 D8 Q8 19
11
EN
1

INPUTS			OUT
EN	D	CK	Q
0	1	⎍	1
0	0	⎍	0
0	X	0	Qo
1	X	X	HI-Z

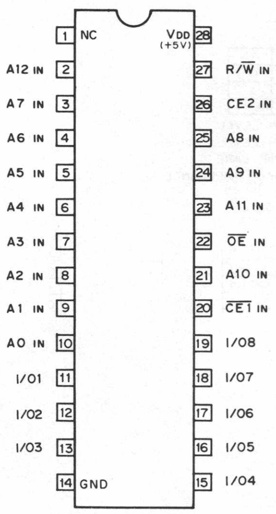
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

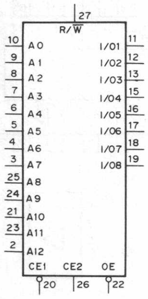

3 2 4 5 7 6 8 9 13 12 14 15 17 16 18 19
D Q
EN
CK 11
EN 1

TC5564PL-15 (TOSHIBA) (ACCESS TIME = 150 nS)

C-MOS 8192 WORDx8-BIT RAM

— TOP VIEW —

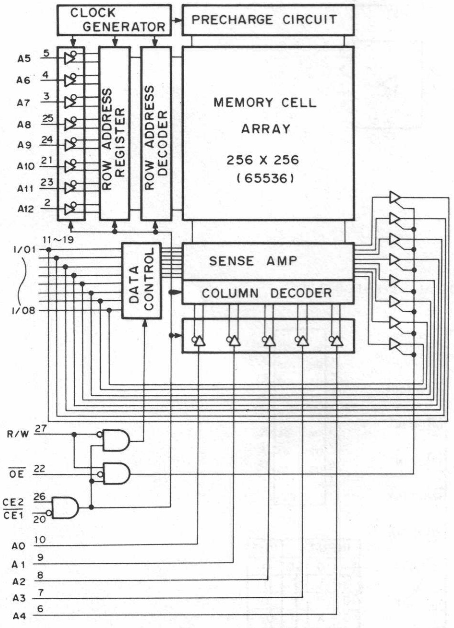

1 NC
VDD (+5V) 28
A12 IN 2
27 R/W IN
A7 IN 3
26 CE2 IN
A6 IN 4
25 A8 IN
A5 IN 5
24 A9 IN
A4 IN 6
23 A11 IN
A3 IN 7
22 OE IN
A2 IN 8
21 A10 IN
A1 IN 9
20 CE1 IN
A0 IN 10
19 I/O8
I/O1 11
18 I/O7
I/O2 12
17 I/O6
I/O3 13
16 I/O5
14 GND
15 I/O4


27
R/W
10 A0
9 A1
8 A2
7 A3
6 A4
5 A5
4 A6
3 A7
25 A8
24 A9
21 A10
23 A11
2 A12
I/O1 11
I/O2 12
I/O3 13
I/O4 15
I/O5 16
I/O6 17
I/O7 18
I/O8 19
CE1 20
CE2 26
OE 22

A0−12 ; ADDRESS INPUTS
CE1,2 ; CHIP ENABLE INPUTS
OE ; OUTPUT ENABLE INPUT
I/O1−8 ; DATA INPUTS/OUTPUTS
R/W ; READ/WRITE INPUT

MODE	$\overline{CE1}$	CE2	$\overline{OE}$	R/$\overline{W}$	I/O1 ~ 8
READ	0	1	0	1	DATA OUTPUTS
WRITE	0	1	X	0	DATA INPUTS
OUTPUT DESELECT	X	X	1	X	HI−Z
STANDBY	1	X	X	X	HI−Z
	X	0	X	X	HI−Z

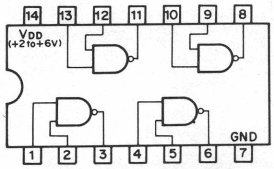
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

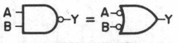

CLOCK GENERATOR
PRECHARGE CIRCUIT
A5 5
A6 4
A7 3
A8 25
A9 24
A10 21
A11 23
A12 2
ROW ADDRESS REGISTER
ROW ADDRESS DECODER
MEMORY CELL ARRAY
256 X 256
(65536)
11~19
I/O1
I/O8
DATA CONTROL
SENSE AMP
COLUMN DECODER
R/W 27
OE 22
CE2 26
CE1 20
A0 10
A1 9
A2 8
A3 7
A4 6

TC74HC00P (TOSHIBA)

C-MOS 2-INPUT NAND GATE

— TOP VIEW —


14 13 12 11 10 9 8
VDD (+2 to +6V)
GND
1 2 3 4 5 6 7



$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

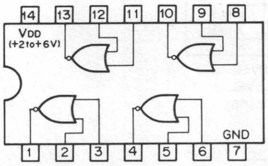
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

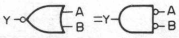
0; LOW LEVEL
1; HIGH LEVEL

TC74HC02P (TOSHIBA)

C MOS 2-INPUT POSITIVE-NOR GATE

— TOP VIEW —


14 13 12 11 10 9 8
VDD (+2 to +6V)
GND
1 2 3 4 5 6 7



$Y = \overline{A + B} = \overline{A} \cdot \overline{B}$

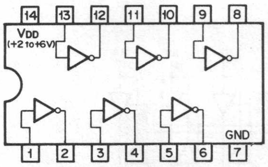
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

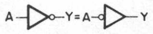
0: LOW LEVEL
1; HIGH LEVEL

TC74HC04F (TOSHIBA) FLAT PACKAGE
TC74HC04P (TOSHIBA)

C-MOS INVERTER

— TOP VIEW —


14 13 12 11 10 9 8
VDD (+2 to +6V)
GND
1 2 3 4 5 6 7



$Y = \overline{A}$

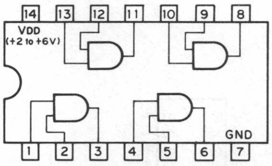
A	Y
0	1
1	0

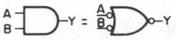
0: LOW LEVEL
1: HIGH LEVEL

TC74HC08P (TOSHIBA)

C-MOS 2-INPUT AND GATE

— TOP VIEW —


14 13 12 11 10 9 8
VDD (+2 to +6V)
GND
1 2 3 4 5 6 7



$Y = A \cdot B = \overline{\overline{A} + \overline{B}}$

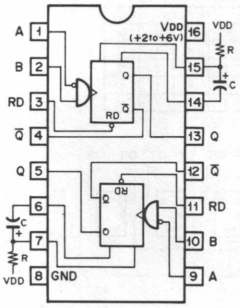
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

TC74HC123P (TOSHIBA)

C-MOS DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR

— TOP VIEW —


A 1
B 2
RD 3
Q 4
Q 5
6
7
VDD 8 GND
16 VDD (+2 to +6V)
VDD
R
C
15
14
13 Q
12 Q
11 RD
10 B
9 A
C
R
VDD
Q
RD
Q
RD

INPUT			OUTPUT	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
1	1	X	0	1
1	X	0	0	1
1	0	↑	⎍	⊔
1	↓	1	⎍	⊔
↑	0	1	⎍	⊔

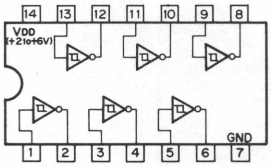
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

OUTPUT PULSE WIDTH = 0.46CR

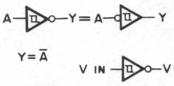
TC74HC14P (TOSHIBA)

C-MOS SCHMITT TRIGGER INVERTER

— TOP VIEW —


14 13 12 11 10 9 8
VDD (+2 to +6V)
GND
1 2 3 4 5 6 7

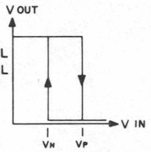
TC74HC14P


A
Y
A
Y
V IN
V OUT

$Y = \overline{A}$

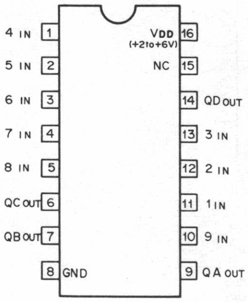
A	Y
0	1
1	0

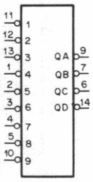
0;LOW LEVEL
1;HIGH LEVEL



VDD	VN	VP
2.0V	0.75V	1.25V
4.5V	1.9V	2.7V
6.0V	2.6V	3.6V

TC74HC147P (TOSHIBA)
C-MOS 10-TO-4-LINE PRIORITY ENCODER
— TOP VIEW —

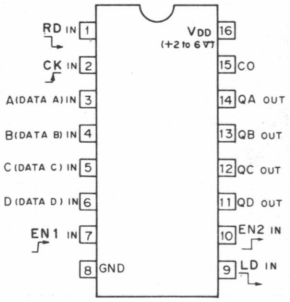

4 IN 1
5 IN 2
6 IN 3
7 IN 4
8 IN 5
QC OUT 6
QB OUT 7
8 GND
VDD (+2 to +6V) 16
NC 15
14 QD OUT
13 3 IN
12 2 IN
11 1 IN
10 9 IN
9 QA OUT

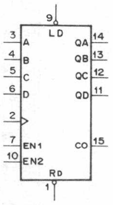

11 1
12 2
13 3
1 4
2 5
3 6
4 7
5 8
10 9
QA 9
QB 7
QC 6
QD 14

INPUT									OUTPUT			
9	8	7	6	5	4	3	2	1	QD	QC	QB	QA
1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	1	1	1	0
1	1	1	1	1	1	1	0	X	1	1	0	1
1	1	1	1	1	1	0	X	X	1	1	0	0
1	1	1	1	1	0	X	X	X	1	0	1	1
1	1	1	1	0	X	X	X	X	1	0	1	0
1	1	1	0	X	X	X	X	X	1	0	0	1
1	1	0	X	X	X	X	X	X	1	0	0	0
1	0	X	X	X	X	X	X	X	0	1	1	1
0	X	X	X	X	X	X	X	X	0	1	1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC163P (TOSHIBA)
C-MOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
— TOP VIEW —


RD IN 1
CK IN 2
A(DATA A) IN 3
B(DATA B) IN 4
C(DATA C) IN 5
D(DATA D) IN 6
EN1 IN 7
8 GND
VDD (+2 to 6V) 16
15 CO
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 IN
9 LD IN


9
LD
3 A
4 B
5 C
6 D
2
7 EN1
10 EN2
RD
1
QA 14
QB 13
QC 12
QD 11
CO 15

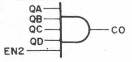
MODE SELECTION

CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

COUNT SEQUENCE

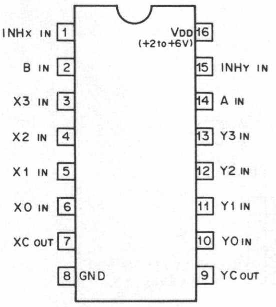
COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

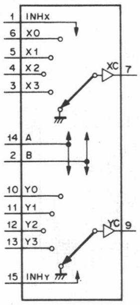
CARRY OUTPUT "CO"


QA
QB
QC
QD
EN2
CO

CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

TC74HC153F (TOSHIBA) FLAT PACKAGE
C-MOS 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

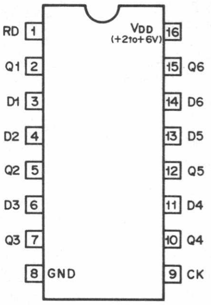

INHx IN 1
B IN 2
X3 IN 3
X2 IN 4
X1 IN 5
X0 IN 6
XC OUT 7
8 GND
VDD (+2 to +6V) 16
15 INHY IN
14 A IN
13 Y3 IN
12 Y2 IN
11 Y1 IN
10 Y0 IN
9 YC OUT

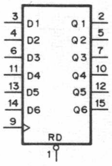

1 INHx
6 X0
5 X1
4 X2
3 X3
XC 7
14 A
2 B
10 Y0
11 Y1
12 Y2
13 Y3
YC 9
15 INHY

CONTROL IN			ON CHANNEL
INH	B	A	
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	X	X	GND

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC174F (TOSHIBA) FLAT PACKAGE
C-MOS D-TYPE FLIP-FLOP WITH RESET
— TOP VIEW —

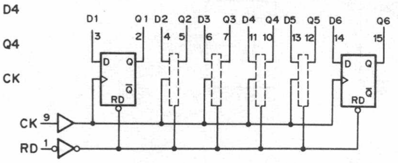

RD 1
Q1 2
D1 3
D2 4
Q2 5
D3 6
Q3 7
8 GND
VDD (+2 to +6V) 16
15 Q6
14 D6
13 D5
12 Q5
11 D4
10 Q4
9 CK


3 D1
4 D2
6 D3
11 D4
13 D5
14 D6
9
RD
1
Q1 2
Q2 5
Q3 7
Q4 10
Q5 12
Q6 15

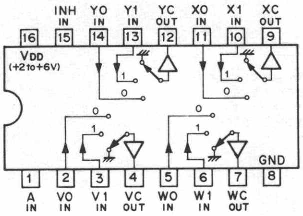
EACH FLIP-FLOP

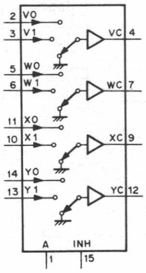
INPUT			OUT
RD	CK	D	Q
0	X	X	0
1	↑	0	0
1	↑	1	1
1	0	X	Qo

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE


D1 3
Q1 2
D2 4
Q2 5
D3 6
Q3 7
D4 11
Q4 10
D5 13
Q5 12
D6 14
Q6 15
D
Q
Q̄
RD
CK 9
RD 1

TC74HC157F (TOSHIBA) FLAT PACKAGE
C-MOS 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

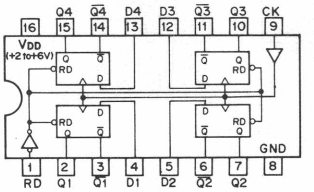

INH IN 15
Y0 IN 14
Y1 IN 13
YC OUT 12
X0 IN 11
X1 IN 10
XC OUT 9
16 VDD (+2 to +6V)
1 A IN
2 V0 IN
3 V1 IN
4 VC OUT
5 W0 IN
6 W1 IN
7 WC OUT
8 GND
0
1

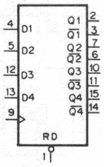

2 V0
3 V1
VC 4
5 W0
6 W1
WC 7
11 X0
10 X1
XC 9
14 Y0
13 Y1
YC 12
A 1
INH 15

CONT. IN		ON CHANNEL
INH	A	
0	0	0
0	1	1
1	X	GND

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC175P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH RESET
— TOP VIEW —

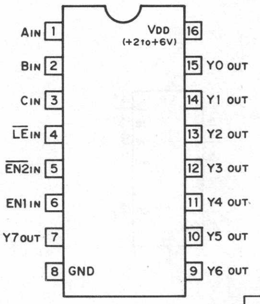

16 VDD (+2 to +6V)
Q4 15
Q̄4 14
D4 13
D3 12
Q̄3 11
Q3 10
CK 9
1 RD
2 Q1
3 Q̄1
4 D1
5 D2
6 Q̄2
7 Q2
8 GND
Q
Q̄
D
RD

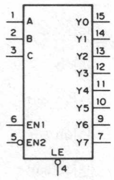

4 D1
5 D2
12 D3
13 D4
9
RD
1
Q1 2
Q̄1 3
Q2 7
Q̄2 6
Q3 10
Q̄3 11
Q4 15
Q̄4 14

RD	CK	D	Q	Q̄
0	X	X	0	1
1	↑	1	1	0
1	↑	0	0	1
1	0	X	Qo	Q̄o

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC237P (TOSHIBA)
C-MOS 3-TO-8 LINE DECODER/LATCH
— TOP VIEW —

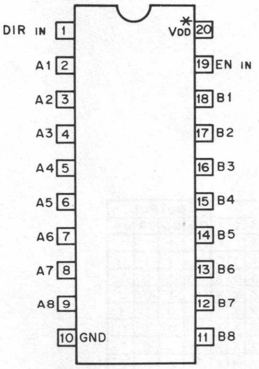

AIN 1
BIN 2
CIN 3
LEIN 4
EN2IN 5
EN1IN 6
Y7OUT 7
8 GND
VDD (+2to+6V) 16
15 Y0 OUT
14 Y1 OUT
13 Y2 OUT
12 Y3 OUT
11 Y4 OUT
10 Y5 OUT
9 Y6 OUT

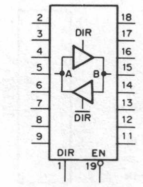

A
B
C
EN1
EN2
LE
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7

INPUTS						OUTPUTS							
ENABLE			SELECT										
$\overline{LE}$	$\overline{EN2}$	EN1	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
X	X	0	X	X	X	0	0	0	0	0	0	0	0
X	1	X	X	X	X	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	1	0	0	0	0	0	0	1	0
0	0	1	0	1	0	0	0	0	0	0	1	0	0
0	0	1	0	1	1	0	0	0	0	1	0	0	0
0	0	1	1	0	0	0	0	0	1	0	0	0	0
0	0	1	1	0	1	0	0	1	0	0	0	0	0
0	0	1	1	1	0	0	1	0	0	0	0	0	0
0	0	1	1	1	1	1	0	0	0	0	0	0	0
1	0	1	X	X	X	HOLD							

1 ; HIGH LEVEL
0 ; LOW LEVEL
X ; DON'T CARE

TC74HC245P (TOSHIBA)
C-MOS BILATERAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT
— TOP VIEW —

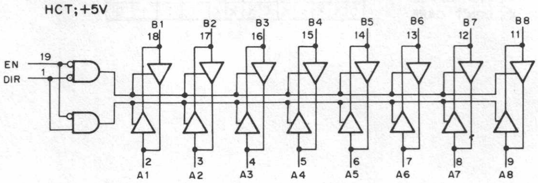

DIR IN 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
10 GND
VDD 20
19 EN IN
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8


DIR
A
B
DIR
DIR
EN

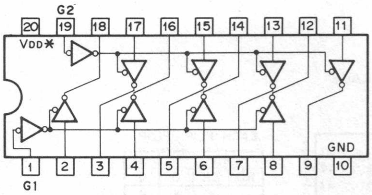
EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI - Z

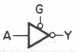
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

∗ VDD HC; +2 to +6V
HCT; +5V


EN
DIR
B1
B2
B3
B4
B5
B6
B7
B8
A1
A2
A3
A4
A5
A6
A7
A8

TC74HC240P (TOSHIBA)
C-MOS 3-STATE INVERTER/LINE DRIVER
— TOP VIEW —

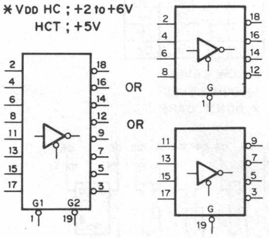

G2
VDD∗
GND
G1



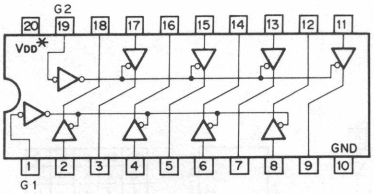
G	A	Y
0	0	1
0	1	0
1	X	HI-Z

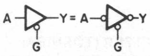
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

∗ VDD HC ; +2 to +6V
HCT ; +5V


OR
OR
G1
G2
G
G

TC74HC244F (TOSHIBA) FLAT PACKAGE
TC74HC244P (TOSHIBA)
C-MOS BUS BUFFER WITH 3-STATE OUTPUT
— TOP VIEW —

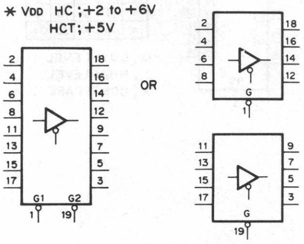

G2
VDD∗
GND
G1



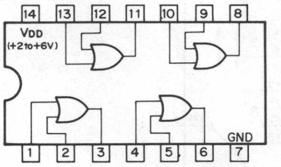
G	A	Y
0	0	0
0	1	1
1	X	HI-Z

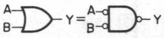
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

∗ VDD HC ;+2 to +6V
HCT; +5V



TC74HC32P (TOSHIBA)
C-MOS 2-INPUT OR GATE
— TOP VIEW —


VDD (+2to+6V)
GND

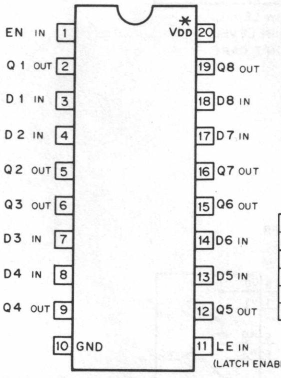


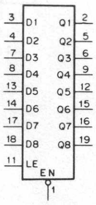
$Y = A + B = \overline{\overline{A} \cdot \overline{B}}$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

TC74HC373P (TOSHIBA)
C-MOS 3-STATE OUTPUTS OCTAL LATCHES
— TOP VIEW —

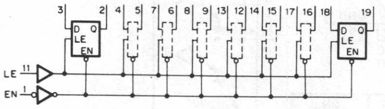

EN IN 1
Q1 OUT 2
D1 IN 3
D2 IN 4
Q2 OUT 5
Q3 OUT 6
D3 IN 7
D4 IN 8
Q4 OUT 9
10 GND
∗ VDD 20
19 Q8 OUT
18 D8 IN
17 D7 IN
16 Q7 OUT
15 Q6 OUT
14 D6 IN
13 D5 IN
12 Q5 OUT
11 LE IN (LATCH ENABLE)


D1
D2
D3
D4
D5
D6
D7
D8
LE
EN
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8

INPUTS			OUT
EN	D	LE	Q
0	1	1	1
0	0	1	0
0	X	0	Qo
1	X	X	HI-Z

HI-Z;
HIGH IMPEDANCE
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

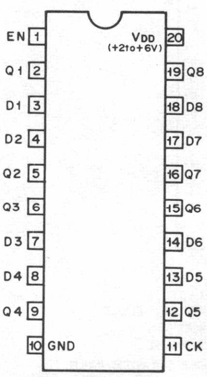
∗ VDD HC; +2 to +6V
HCT; +5V

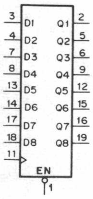

D Q
LE
EN
LE
EN

TC74HC374F (TOSHIBA) FLAT PACKAGE
TC74HC374P (TOSHIBA)

C-MOS 3-STATE OCTAL D-TYPE FLIP-FLOP

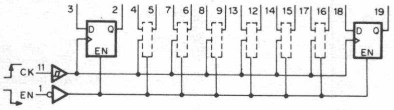
— TOP VIEW —


EN 1
Q1 2
D1 3
D2 4
Q2 5
Q3 6
D3 7
D4 8
Q4 9
10 GND
VDD (+2to+6V) 20
19 Q8
18 D8
17 D7
16 Q7
15 Q6
14 D6
13 D5
12 Q5
11 CK


3 D1
4 D2
7 D3
8 D4
13 D5
14 D6
17 D7
18 D8
11
Q1 2
Q2 5
Q3 6
Q4 9
Q5 12
Q6 15
Q7 16
Q8 19
EN
1

INPUTS			OUT
EN	D	CK	Q
0	1	↑	1
0	0	↑	0
0	X	0	Qo
1	X	X	HI-Z

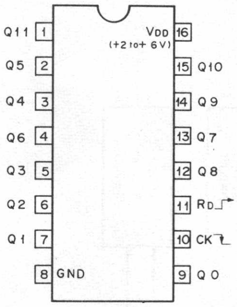
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

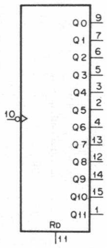

3
2
4
5
7
6
8
9
13
12
14
15
17
16
18
19
D
Q
EN
CK 11
EN 1

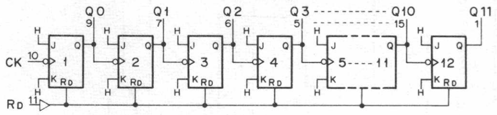
TC74HC4040P (TOSHIBA)

C-MOS 12-STAGE RIPPLE CARRY BINARY COUNTER/DRIVER

— TOP VIEW —


Q11 1
Q5 2
Q4 3
Q6 4
Q3 5
Q2 6
Q1 7
8 GND
VDD (+2 to + 6V) 16
15 Q10
14 Q9
13 Q7
12 Q8
11 RD
10 CK
9 Q0


10
Q0 9
Q1 7
Q2 6
Q3 5
Q4 3
Q5 2
Q6 4
Q7 13
Q8 12
Q9 14
Q10 15
Q11 1
RD
11


Q0
9
Q1
7
Q2
6
Q3 ------------ Q10
5
15
Q11
1
CK 10
RD 11
H
J
Q
K
RD
1
2
3
4
5----11
12

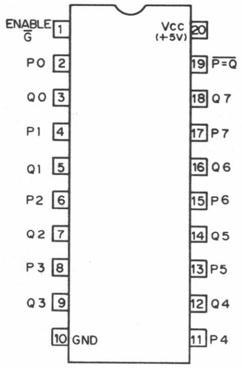
COUNT	Q11	Q10	Q9	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	0	0	0	0	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
4095	1	1	1	1	1	1	1	1	1	1	1	1

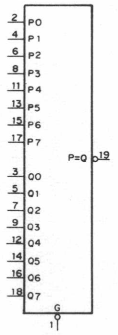
RD	Q11 -------- Q0
1	ALL LOW
0	COUNT

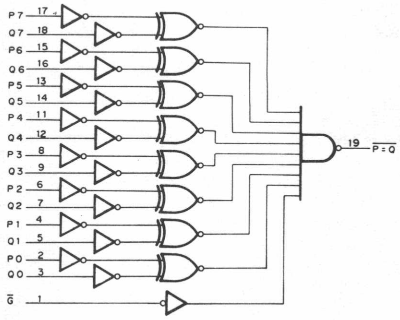
0; LOW LEVEL
1; HIGH LEVEL

TC74HC688P (TOSHIBA)

C-MOS 8-BIT MAGNITUDE COMPARATOR


ENABLE G̅ 1
P0 2
Q0 3
P1 4
Q1 5
P2 6
Q2 7
P3 8
Q3 9
10 GND
Vcc (+5V) 20
19 P=Q
18 Q7
17 P7
16 Q6
15 P6
14 Q5
13 P5
12 Q4
11 P4


2 P0
4 P1
6 P2
8 P3
11 P4
13 P5
15 P6
17 P7
3 Q0
5 Q1
7 Q2
9 Q3
12 Q4
14 Q5
16 Q6
18 Q7
P=Q 19
G
1


P7 17
Q7 18
P6 15
Q6 16
P5 13
Q5 14
P4 11
Q4 12
P3 8
Q3 9
P2 6
Q2 7
P1 4
Q1 5
P0 2
Q0 3
G̅ 1
19
P=Q

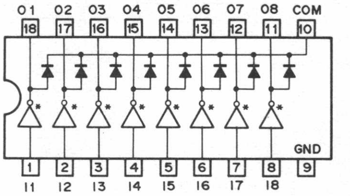
INPUTS		OUTPUT
P,Q	G̅	$\overline{P=Q}$
P=Q	0	0
P>Q	0	1
P<Q	0	1
X	1	1

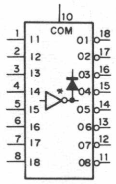
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TD62083AP (TOSHIBA)

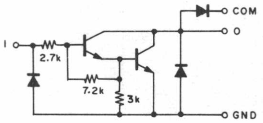
DARLINGTON DRIVER

— TOP VIEW —


O1
O2
O3
O4
O5
O6
O7
O8
COM
18
17
16
15
14
13
12
11
10
*
GND
1
2
3
4
5
6
7
8
9
I1
I2
I3
I4
I5
I6
I7
I8


10
COM
1 I1
2 I2
3 I3
4 I4
5 I5
6 I6
7 I7
8 I8
O1 18
O2 17
O3 16
O4 15
O5 14
O6 13
O7 12
O8 11
*

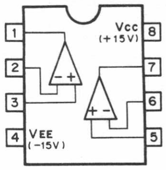
*; OPEN COLLECTOR


I
2.7k
7.2k
3k
COM
O
GND

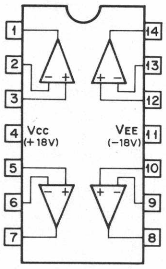
TL082CP (TI)
uPC4082C (NEC)

OPERATIONAL AMPLIFIER
(J FET-INPUT)

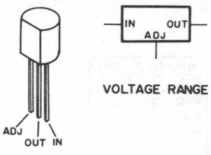
— TOP VIEW —


1
2
3
4
VEE (−15V)
Vcc (+15V)
8
7
6
5
−
+

TL084CN (TI)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —

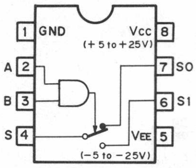

1
2
3
4 Vcc (+18V)
5
6
7
14
13
12
11 VEE (−18V)
10
9
8

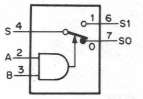
TL317LP (TI)
3-TERMINAL ADJUSTABLE REGULATOR


IN
OUT
ADJ
ADJ
OUT
IN

VOLTAGE RANGE ; 1.2 to 32V

TL601CP (TI)
P-MOS ANALOG SWITCH
— TOP VIEW —

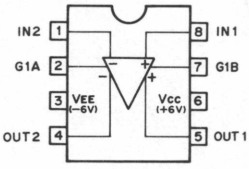

1 GND
Vcc (+5 to +25V) 8
A 2
7 SO
B 3
6 S1
S 4
VEE (−5 to −25V) 5


S 4
A 2
B 3
1
6 S1
7 SO

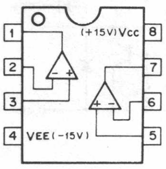
CONT IN		ON CHANNEL
A	B	
0	0	SO
0	1	SO
1	0	SO
1	1	S1

0; LOW LEVEL
1; HIGH LEVEL

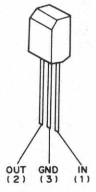
uPC1663C (NEC)
WIDEBAND VIDEO AMPLIFIER
— TOP VIEW —


IN2 1
G1A 2
3 VEE (−6V)
OUT2 4
8 IN1
7 G1B
Vcc (+6V) 6
5 OUT1

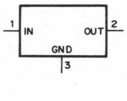
uPC4558C (NEC)
OPERATIONAL AMPLIFIER
— TOP VIEW —


1
2
3
4 VEE (−15V)
(+15V) Vcc 8
7
6
5

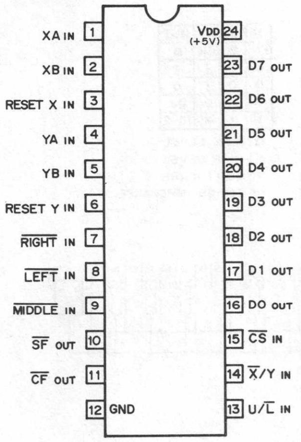
uPC78L??A (NEC)
POSITIVE VOLTAGE REGULATOR (100mA)

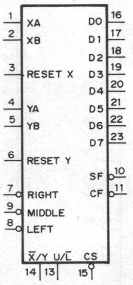

OUT (2)
GND (3)
IN (1)

OUTPUT VOLTAGE	uPC78L??	uPC78L??A
5V	uPC78L05	uPC78L05A
8V	uPC78L08	
12V	uPC78L12	
15V	uPC78L15	


1 IN
OUT 2
GND
3

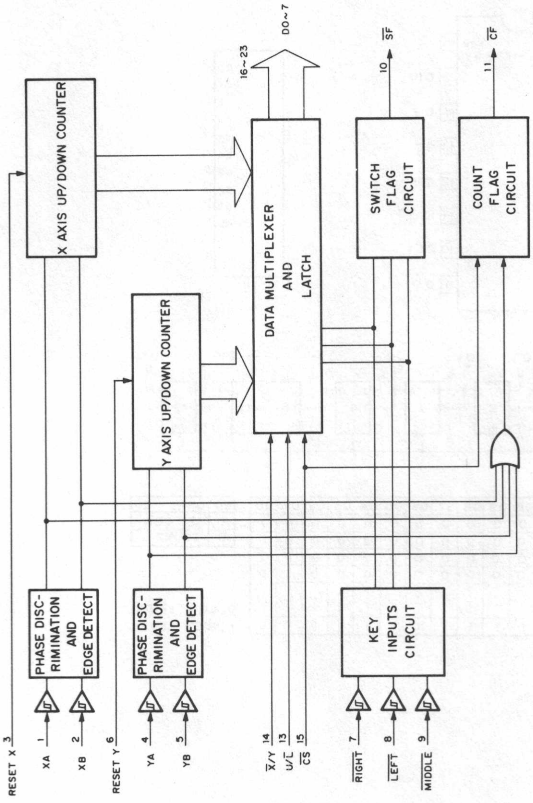
uPD4701AC (NEC)
C-MOS INCREMENTAL ROTARY ENCODER
— TOP VIEW —


XA IN 1
XB IN 2
RESET X IN 3
YA IN 4
YB IN 5
RESET Y IN 6
RIGHT IN 7
LEFT IN 8
MIDDLE IN 9
SF OUT 10
CF OUT 11
12 GND
VDD (+5V) 24
23 D7 OUT
22 D6 OUT
21 D5 OUT
20 D4 OUT
19 D3 OUT
18 D2 OUT
17 D1 OUT
16 D0 OUT
15 CS IN
14 X/Y IN
13 U/L IN


1 XA
2 XB
3 RESET X
4 YA
5 YB
6 RESET Y
7 RIGHT
9 MIDDLE
8 LEFT
D0 16
D1 17
D2 18
D3 19
D4 20
D5 21
D6 22
D7 23
SF 10
CF 11
X/Y U/L CS
14 13 15

$\overline{CS}$; CHIP SELECT
$\overline{X}/Y$; X/Y COUNTER SELECT
XA,YA ; INPUT A PHASE
XB,YB ; INPUT B PHASE
RIGHT, LEFT, MIDDLE ; SWITCH INPUT FOR INTERNAL STATUS

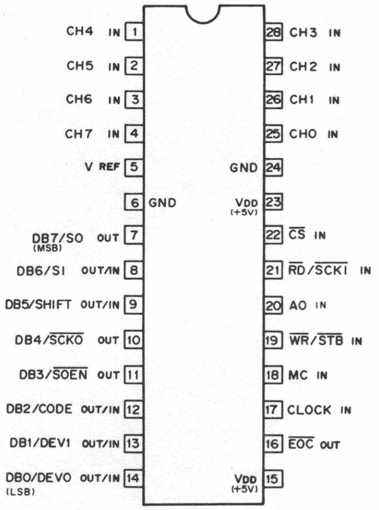
$U/\overline{L}$; UPER/LOWER BYTE SELECT
D0~D7 ; DATA
CF ; COUNT FLAG
SF ; SWITCH FLAG
RESET X ; COUNTER RESET
RESET Y ; COUNTER RESET

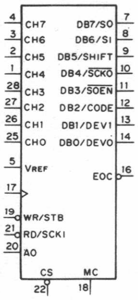

X AXIS UP/DOWN COUNTER
Y AXIS UP/DOWN COUNTER
DATA MULTIPLEXER AND LATCH
SWITCH FLAG CIRCUIT
COUNT FLAG CIRCUIT
PHASE DISCRIMINATION AND EDGE DETECT
PHASE DISCRIMINATION AND EDGE DETECT
KEY INPUTS CIRCUIT
16~23
D0~7
10 SF
11 CF
RESET X 3
XA 1
XB 2
RESET Y 6
YA 4
YB 5
X/Y 14
U/L 13
CS 15
RIGHT 7
LEFT 8
MIDDLE 9

uPD7004C (NEC)

C-MOS 10-BIT SUCCESSIVE COMPARATOR TYPE A/D CONVERTER

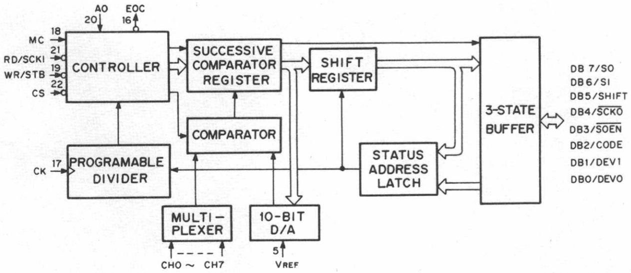
— TOP VIEW —


CH4 IN 1
CH5 IN 2
CH6 IN 3
CH7 IN 4
V REF 5
6 GND
DB7/SO OUT 7 (MSB)
DB6/SI OUT/IN 8
DB5/SHIFT OUT/IN 9
DB4/SCKO OUT 10
DB3/SOEN OUT 11
DB2/CODE OUT/IN 12
DB1/DEV1 OUT/IN 13
DB0/DEV0 OUT/IN 14 (LSB)
VDD (+5V) 15
16 EOC OUT
17 CLOCK IN
18 MC IN
19 WR/STB IN
20 A0 IN
21 RD/SCKI IN
22 CS IN
VDD (+5V) 23
GND 24
25 CH0 IN
26 CH1 IN
27 CH2 IN
28 CH3 IN


4 CH7
3 CH6
2 CH5
1 CH4
28 CH3
27 CH2
26 CH1
25 CH0
5 VREF
17
19 WR/STB
21 RD/SCKI
20 A0
CS 22
MC 18
DB7/SO 7
DB6/SI 8
DB5/SHIFT 9
DB4/SCKO 10
DB3/SOEN 11
DB2/CODE 12
DB1/DEV1 13
DB0/DEV0 14
EOC 16

A0 ; CONTROL ADDRESS INPUT
CH0~7 ; ANALOG INPUT
CODE ; CODE SELECT (2'S COMPLEMENT/ BINARY) INPUT
CS ; CHIP SELECT INPUT
DB0~7 ; DATA BUS INPUT/OUTPUT
DEV0, DEV1 ; CLOCK RATE SELECT INPUT
EOC ; CONVERSION ENDING SIGNAL OUTPUT
MC ; MODE SELECT INPUT
RD ; READ SIGNAL INPUT

SCKI ; SERIAL CLOCK INPUT
SCKO ; SERIAL CLOCK OUTPUT
SHIFT ; SHIFT SELECT (LSB FIRST/ MSB FIRST)
SI ; SERIAL INPUT
SO ; SERIAL OUTPUT
SOEN ; SERIAL OUTPUT ENABLE OUTPUT
STB ; ADDRESS WRITE STROBE SIGNAL INPUT
WR ; WRITE SIGNAL INPUT


A0
EOC
20
16
18
MC
21
RD/SCKI
19
WR/STB
22
CS
CONTROLLER
SUCCESSIVE COMPARATOR REGISTER
SHIFT REGISTER
COMPARATOR
3-STATE BUFFER
17
CK
PROGRAMABLE DIVIDER
STATUS ADDRESS LATCH
MULTI-PLEXER
10-BIT D/A
CH0 ~ CH7
5
VREF
DB 7/SO
DB6/SI
DB5/SHIFT
DB4/SCKO
DB3/SOEN
DB2/CODE
DB1/DEV1
DB0/DEV0

MC	MODE
0	SERIAL
1	PARALLEL

PARALLEL MODE

$\overline{CS}$	$\overline{WR}$	$\overline{RD}$	A0	MODE
1	X	X	X	HIGH IMPEDANCE
0	1	1	X	HIGH IMPEDANCE
0	0	1	0	*1 ANALOG CHANNEL SELECT
0	0	1	1	*2 CODE SELECT/ *3 CLOCK RATE SELECT
0	1	0	0	*4 LOW-BYTE DATA OUTPUT
0	1	0	1	*4 HIGH-BYTE DATA OUTPUT
0	0	0	X	INHIBIT

0 ; LOW LEVEL X : DON'T CARE
1 ; HIGH LEVEL

*1 ANALOG CHANNEL

SEL2	SEL1	SEL0	MPX CHAN.
0	0	0	CH0
0	0	1	CH1
0	1	0	CH2
0	1	1	CH3
1	0	0	CH4
1	0	1	CH5
1	1	0	CH6
1	1	1	CH7

*2 CODE SELECT

CODE	CODE SELECT
0	BINARY DATA
1	2'S COMPLEMENT DATA

*3 CLOCK RATE SELECT

DEV1	DEV 0	CLOCK RATE
0	0	1
0	1	1/2
1	0	1/4
1	1	1/8

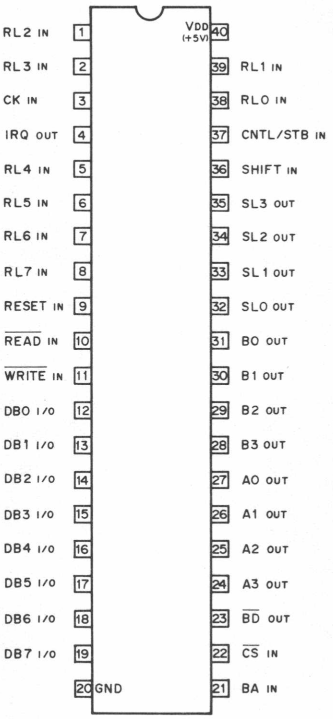
*4 LOW/HIGH-BYTE DATA

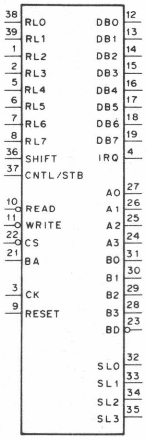
	DB7	DB 6	DB5	DB4	DB3	DB2	DB1	DB 0
HIGH-BYTE	MSB	2ND	3RD	4TH	5TH	6TH	7TH	8TH
LOW- BYTE	9TH	0	0	0	0	0	0	0

uPD8279C-5 (NEC)

N-MOS PROGRAMMABLE KEYBOARD/DISPLAY CONTROLLER

— TOP VIEW —

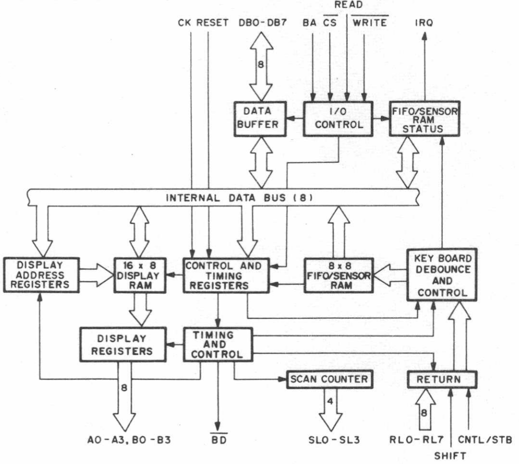

RL2 IN 1
RL3 IN 2
CK IN 3
IRQ OUT 4
RL4 IN 5
RL5 IN 6
RL6 IN 7
RL7 IN 8
RESET IN 9
READ IN 10
WRITE IN 11
DB0 I/O 12
DB1 I/O 13
DB2 I/O 14
DB3 I/O 15
DB4 I/O 16
DB5 I/O 17
DB6 I/O 18
DB7 I/O 19
20 GND
VDD (+5V) 40
39 RL1 IN
38 RL0 IN
37 CNTL/STB IN
36 SHIFT IN
35 SL3 OUT
34 SL2 OUT
33 SL1 OUT
32 SL0 OUT
31 B0 OUT
30 B1 OUT
29 B2 OUT
28 B3 OUT
27 A0 OUT
26 A1 OUT
25 A2 OUT
24 A3 OUT
23 BD OUT
22 CS IN
21 BA IN


38 RL0
39 RL1
1 RL2
2 RL3
5 RL4
6 RL5
7 RL6
8 RL7
36 SHIFT
37 CNTL/STB
10 READ
11 WRITE
22 CS
21 BA
3 CK
9 RESET
DB0 12
DB1 13
DB2 14
DB3 15
DB4 16
DB5 17
DB6 18
DB7 19
IRQ 4
A0 27
A1 26
A2 25
A3 24
B0 31
B1 30
B2 29
B3 28
BD 23
SL0 32
SL1 33
SL2 34
SL3 35

PIN NAMES

CK ; CLOCK
$\overline{\text{RESET}}$; RESET
$\overline{\text{CS}}$; CHIP SELECT
$\overline{\text{READ}}$; READ
$\overline{\text{WRITE}}$; WRITE
BA ; BUFFER ADDRESS
IRQ ; INTERRUPT REQUEST
SL0-SL3 ; SCAN LINES
RL0-RL7 ; RETURN LINES
SHIFT ; SHIFT
CNTL/STB ; CONTROL/STROBE
A0-A3 ; DISPLAY(A) OUTPUT
B0-B3 ; DISPLAY(B) OUTPUT
$\overline{\text{BD}}$; BLANK DISPLAY OUTPUT
DB0-DB7 ; DATA BUS

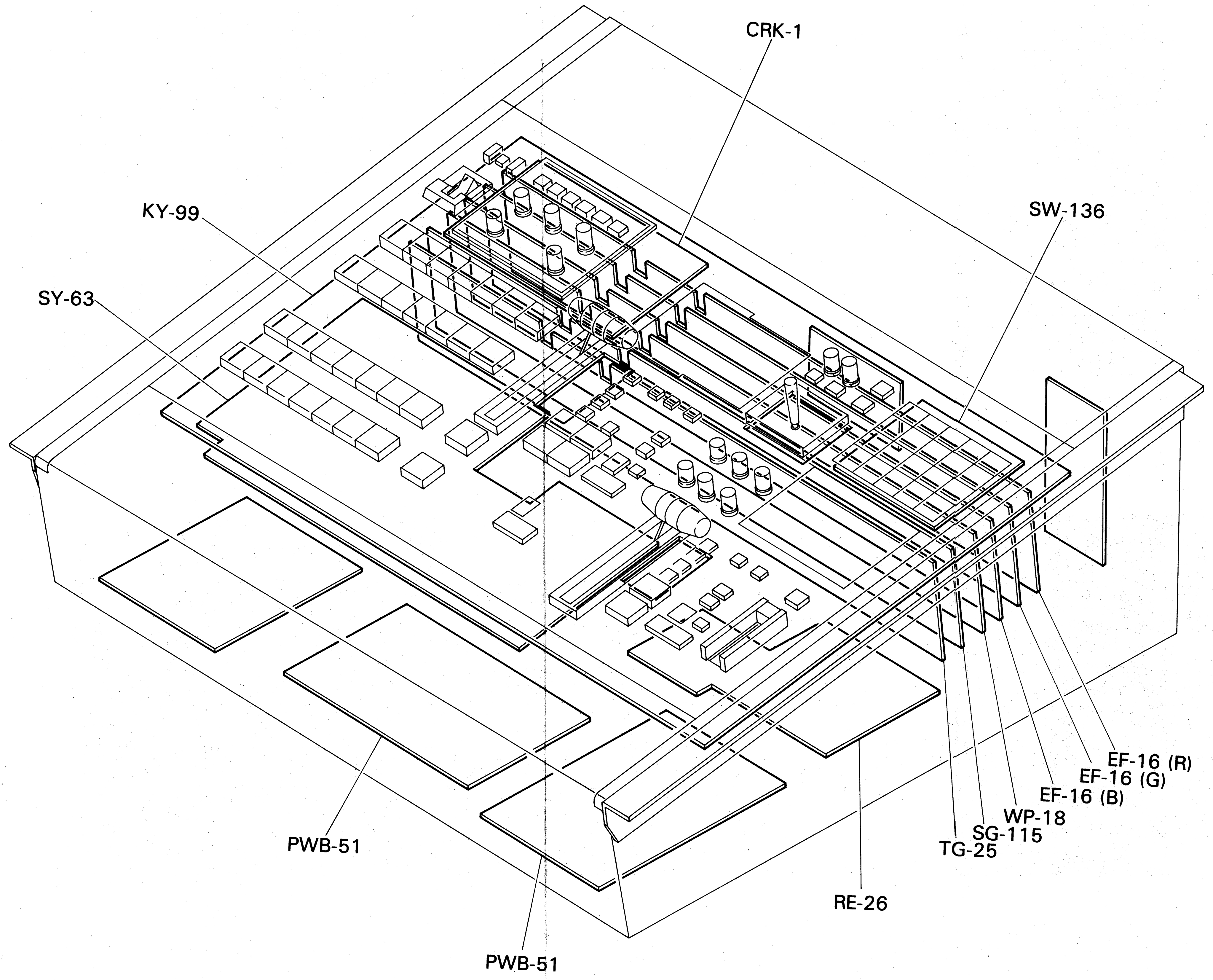
INTERNAL BLOCK DIAGRAM

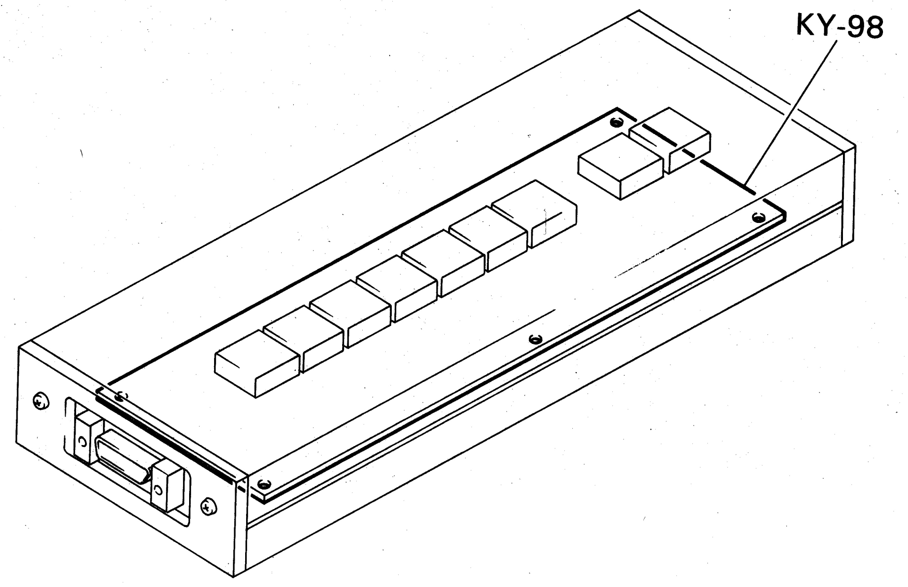

CK
RESET
DB0-DB7
BA
CS
READ
WRITE
IRQ
8
DATA BUFFER
I/O CONTROL
FIFO/SENSOR RAM STATUS
INTERNAL DATA BUS (8)
DISPLAY ADDRESS REGISTERS
16 x 8 DISPLAY RAM
CONTROL AND TIMING REGISTERS
8 x 8 FIFO/SENSOR RAM
KEY BOARD DEBOUNCE AND CONTROL
DISPLAY REGISTERS
TIMING AND CONTROL
SCAN COUNTER
RETURN
8
4
8
A0-A3, B0-B3
BD
SL0-SL3
RL0-RL7
CNTL/STB
SHIFT

SECTION C

SCHEMATIC DIAGRAMS AND BOARD ILLUSTRATIONS

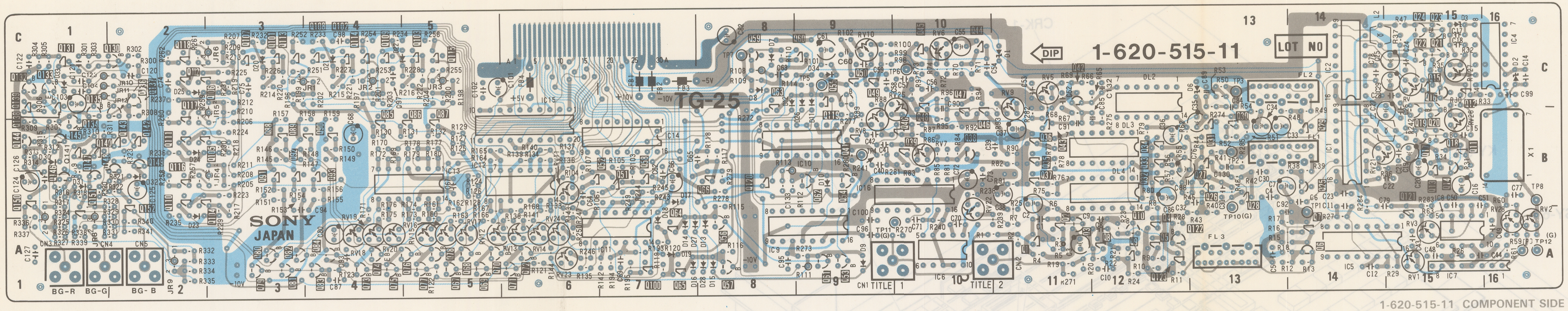
BOARD LAYOUT


CRK-1
KY-99
SW-136
SY-63
EF-16 (R)
EF-16 (G)
EF-16 (B)
WP-18
SG-115
TG-25
PWB-51
RE-26
PWB-51

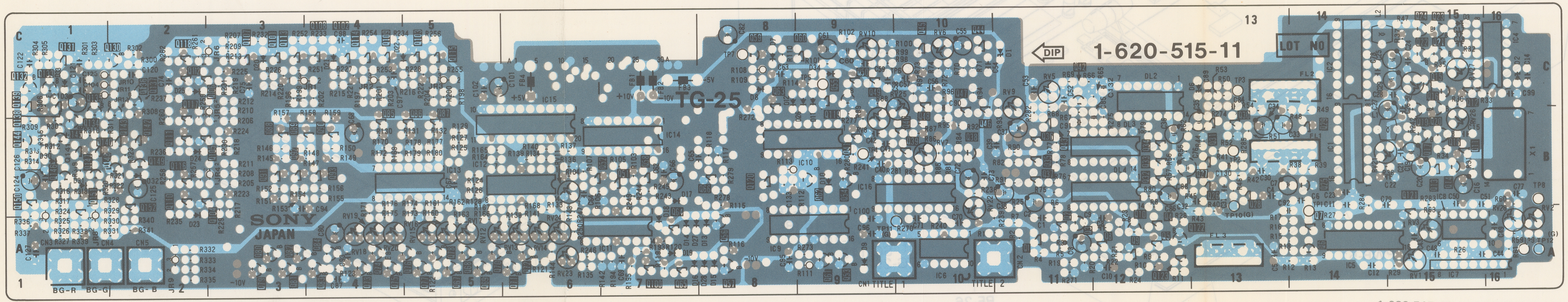


TG-25 BOARD

Component side



1-620-515-11 COMPONENT SIDE



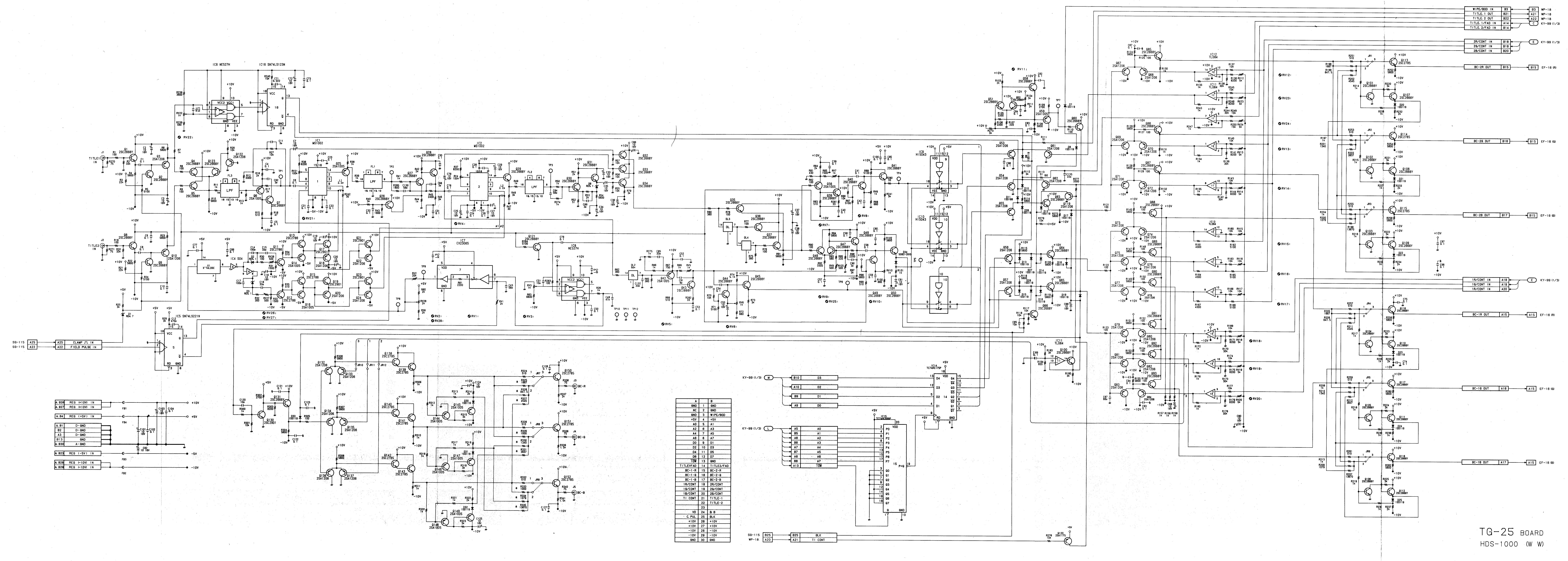
1-620-515-11 COMPONENT SIDE

TG-25 1-620-515-11

D1	C-11	Q1	A-11	Q61	A-9	Q135	C-1
D2	C-16	Q2	A-11	Q62	B-9	Q136	C-2
D3	C-15	Q3	A-11	Q63	C-8	Q137	C-2
D6	C-13	Q4	A-12	Q64	A-7	Q138	C-1
D7	C-8	Q5	A-12	Q65	A-7	Q139	C-1
D8	C-8	Q6	A-14	Q66	B-8	Q140	B-1
D9	A-9	Q7	A-14	Q67	A-7	Q141	B-1
D10	B-9	Q8	A-12	Q68	A-7	Q142	B-2
D11	C-9	Q9	A-12	Q69	A-7	Q143	B-2
D12	C-8	Q10	A-12	Q70	A-7	Q144	B-1
D13	A-8	Q11	B-15	Q71	A-6	Q145	B-1
D14	A-7	Q12	C-15	Q72	A-6	Q146	B-1
D15	A-8	Q13	B-15	Q73	A-4	Q147	B-1
D16	A-7	Q14	B-15	Q74	A-4	Q148	B-2
D17	B-7	Q15	C-15	Q75	A-4	Q149	B-2
D18	A-7	Q16	C-15	Q76	A-5	Q150	B-1
D19	A-7	Q17	B-15	Q77	A-5	Q151	B-1
D20	C-3	Q18	B-15	Q78	A-5	Q152	B-2
D21	C-4	Q19	B-15	Q79	A-3		
D22	C-5	Q20	B-15	Q80	A-3	RV1	A-15
D23	A-2	Q21	C-15	Q81	A-3	RV2	A-16
D24	B-2	Q22	C-15	Q82	A-3	RV3	A-15
D25	A-2	Q23	C-15	Q83	A-4	RV4	C-15
D26	C-9	Q24	C-15	Q84	A-4	RV5	C-11
D27	A-7	Q25	B-14	Q85	B-4	RV6	C-10
D28	A-8	Q26	B-13	Q86	B-5	RV7	B-10
D30	B-1	Q27	B-13	Q87	B-5	RV8	B-9
D31	B-1	Q28	B-13	Q88	B-3	RV9	C-11
D32	B-2	Q29	B-14	Q89	B-4	RV10	C-9
D33	C-1	Q30	B-13	Q90	B-4	RV11	B-6
D34	C-9	Q31	B-13	Q91	B-3	RV12	A-5
		Q32	B-12	Q92	B-3	RV13	A-6
DL2	C-12	Q33	B-12	Q93	B-4	RV14	A-6
DL3	B-12	Q34	B-12	Q100	A-7	RV15	A-5
DL4	B-12	Q35	B-11	Q101	C-3	RV16	A-5
		Q36	B-11	Q102	C-4	RV17	A-5
FB1	C-7	Q37	B-11	Q103	C-5	RV18	A-4
FB2	C-7	Q38	B-10	Q104	B-2	RV19	A-4
FB3	C-7	Q39	B-10	Q105	B-2	RV20	A-4
FB4	C-6	Q40	B-10	Q106	C-2	RV21	B-15
		Q41	B-9	Q107	C-3	RV22	A-10
FL1	B-13	Q42	C-11	Q108	C-4	RV23	A-6
FL2	C-13	Q43	B-11	Q109	C-4	RV24	A-6
FL3	A-13	Q44	C-10	Q110	B-2	RV25	C-10
		Q45	C-10	Q111	B-2	RV26	B-15
IC1	B-14	Q46	C-10	Q112	C-2	RV27	C-15
IC2	C-14	Q47	C-10	Q113	C-3	RV28	A-16
IC4	C-16	Q48	C-10	Q114	C-4		
IC5	A-14	Q49	C-9	Q115	C-5	TP1	A-14
IC6	A-10	Q50	C-9	Q116	B-2	TP2	B-13
IC7	A-15	Q51	B-7	Q117	B-2	TP3	C-13
IC8	A-15	Q52	B-6	Q118	C-2	TP4	B-9
IC9	A-9	Q53	A-9	Q119	C-9	TP5	C-9
IC10	B-9	Q54	B-9	Q120	B-2	TP6	C-10
IC11	A-7	Q55	C-9	Q121	A-15	TP7	C-8
IC12	B-6	Q56	A-8	Q122	A-12	TP8	B-16
IC13	B-5	Q57	A-8	Q123	A-12	TP9	A-16
IC14	B-7	Q58	B-7	Q130	C-2	TP10	B-13
IC15	B-6	Q59	C-8	Q131	C-1	TP11	A-10
IC16	B-10	Q60	C-9	Q132	C-1	TP12	A-16
				Q133	C-1		
				Q134	B-1	X1	B-16

TG-25 BOARD

TITLE GEN

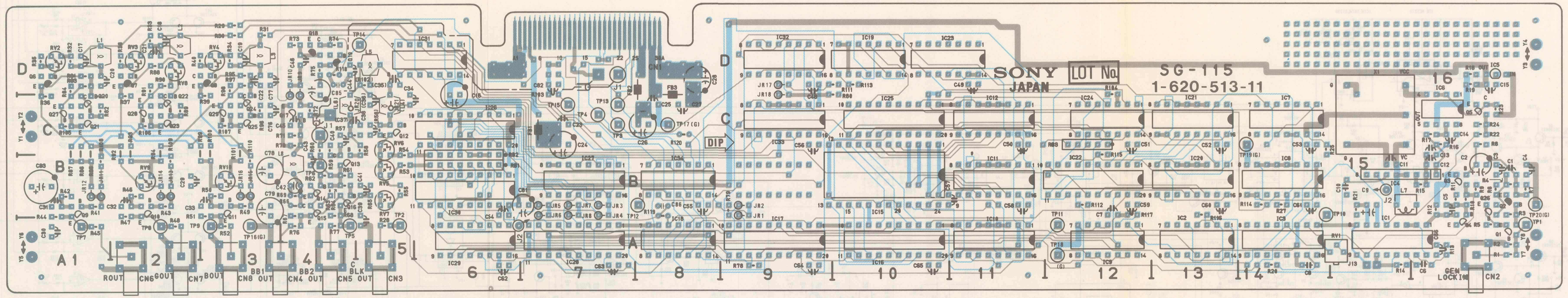


A		B
GND	1	GND
NC	2	GND
GND	3	WIPE/BOD
+5V	4	+5V
A0	5	A1
A2	6	A3
A4	7	A5
A6	8	A7
D0	9	D1
D2	10	D3
D4	11	D5
D6	12	D7
$\overline{IOW}$	13	GND
TITLE1/FAD	14	TITLE2/FAD
BC-1·R	15	BC-2·R
BC-1·G	16	BC-2·G
BC-1·B	17	BC-2·B
1R/CONT	18	2R/CONT
1G/CONT	19	2G/CONT
1B/CONT	20	2B/CONT
TI CONT	21	TITLE·1
	22	TITLE·2
	23	
VD	24	B. B
C. PUL	25	BLK
+10V	26	+10V
+10V	27	+10V
-10V	28	-10V
-10V	29	-10V
GND	30	GND

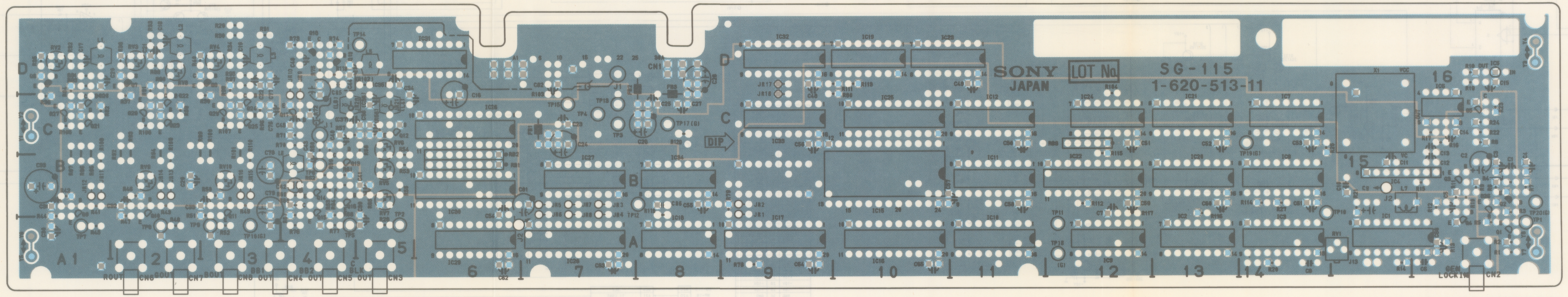
TG-25 BOARD
HDS-1000 (W W)

SG-115 BOARD

Component side


SONY
JAPAN
LOT No.
SG-115
1-620-513-11
A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
ROUT
CN6
GOUT
CN7
BOUT
CN8
OUT
BB1
BB2
CN4
OUT
C BLK
CN5
OUT
CN3
GEN LOCK IN
CN2
DIP

1-620-513-11 COMPONENT SIDE


SONY
JAPAN
LOT No.
SG-115
1-620-513-11
A
B
C
D
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
ROUT
CN6
CN7
CN8
CN4
OUT
CN5
OUT
CN3
LOCK IN
CN2
DIP

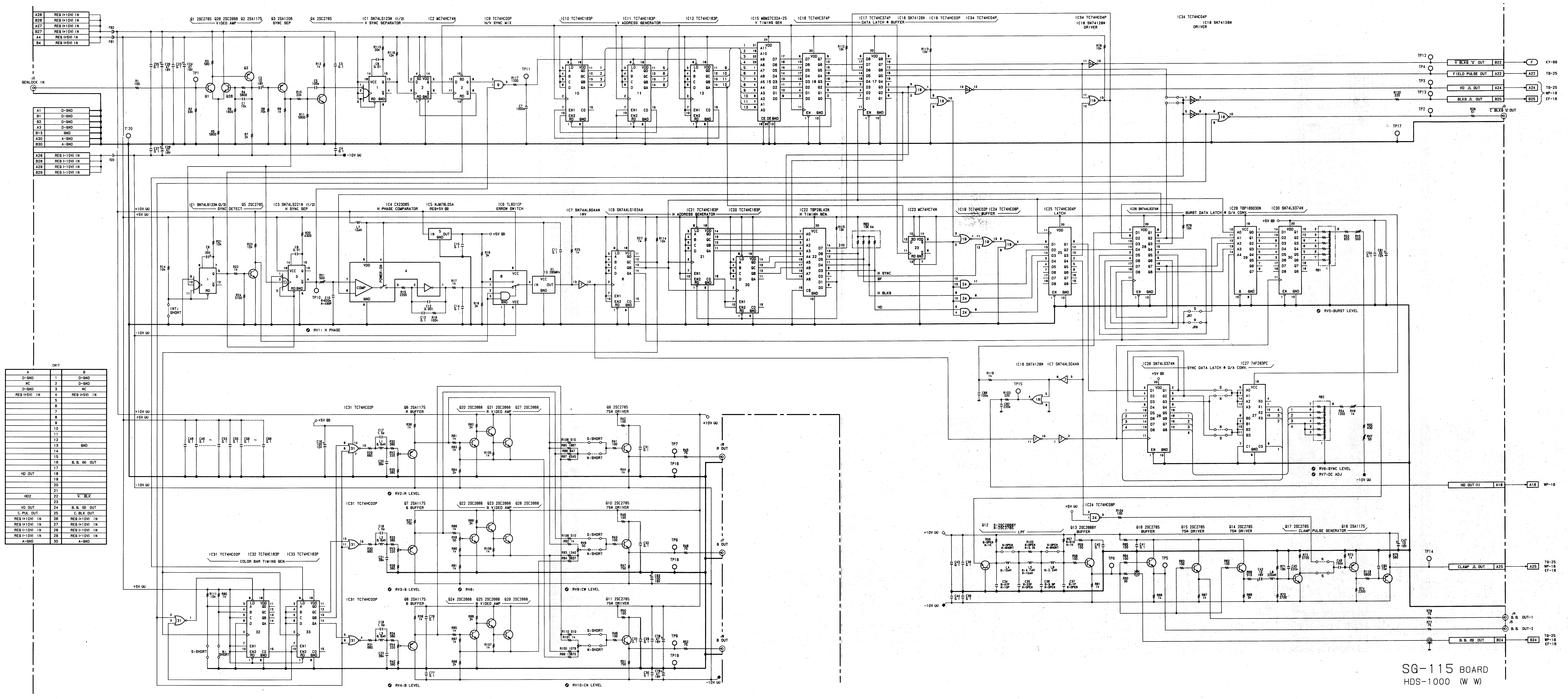
1-620-513-11 COMPONENT SIDE

SG-115 1-620-513-11

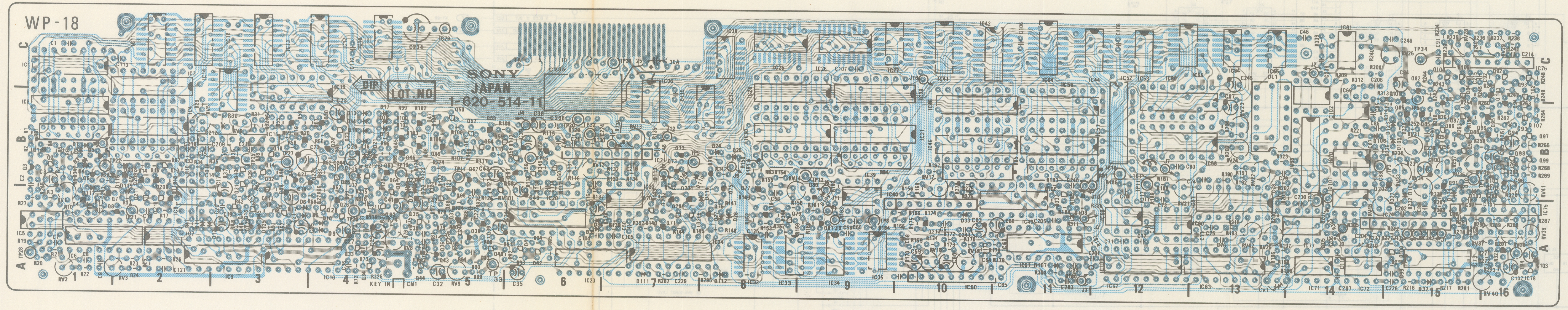
FB1	C-7	Q16	B-4
FB2	C-7	Q17	C-4
FB3	C-8	Q18	D-4
		Q19	D-4
IC1	A-15	Q20	C-1
IC2	A-13	Q21	C-1
IC3	A-14	Q22	C-2
IC4	B-15	Q23	C-2
IC5	D-16	Q24	C-3
IC6	C-16	Q25	C-3
IC7	C-14	Q26	A-16
IC8	B-14	Q27	C-1
IC9	A-12	Q28	C-2
IC10	A-11	Q29	C-3
IC11	B-11		
IC15	B-10	RB1	B-6
IC16	A-10	RB2	B-6
IC17	A-9	RB3	C-12
IC18	A-8		
IC19	D-10	RV1	A-15
IC20	B-13	RV2	D-1
IC21	C-13	RV3	D-2
IC22	B-12	RV4	D-2
IC23	D-11	RV5	B-5
IC24	C-12	RV6	C-5
IC25	C-10	RV7	B-5
IC26	C-6	RV8	D-2
IC27	B-7	RV9	B-2
IC28	A-7	RV10	B-3
IC29	A-6		
IC30	B-6	X1	C-15
IC31	D-6		
IC32	D-9	TP1	A-16
IC33	C-9	TP2	A-5
IC34	B-8	TP3	C-7
		TP4	C-7
Q1	A-16	TP5	A-4
Q2	B-16	TP6	B-4
Q3	B-2	TP7	A-1
Q4	A-16	TP8	A-2
Q5	C-16	TP9	A-3
Q6	D-1	TP10	A-14
Q7	D-2	TP11	A-12
Q8	D-3	TP12	B-8
Q9	B-1	TP13	C-7
Q10	B-2	TP14	D-5
Q11	B-3	TP15	C-7
Q12	C-5		
Q13	B-4	TPE1	A-3
Q14	B-4	TPE2	C-8
Q15	B-4	TPE3	A-12
Q16	B-4	TPE4	C-14
Q15	B-4	TPE5	B-16
		X1	C-15

SG-115 BOARD

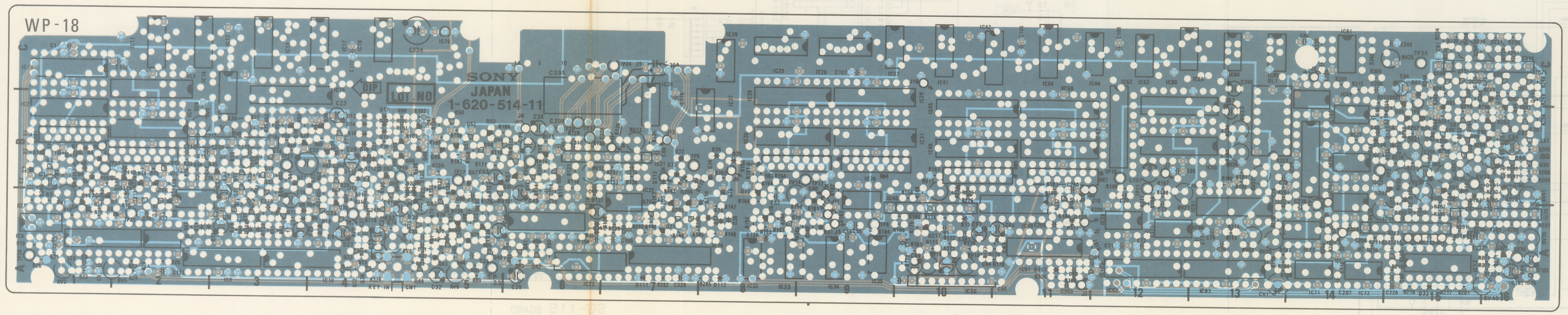
SYNC GEN


A26 REG (+10V) IN
B26 REG (+10V) IN
A27 REG (+10V) IN
B27 REG (+10V) IN
A4 REG (+5V) IN
B4 REG (+5V) IN
FB2
FB1
J2 GENLOCK IN
R1 100
A1 D-GND
B1 D-GND
B2 D-GND
A3 D-GND
B13 GND
A30 A-GND
B30 A-GND
A28 REG (-10V) IN
B28 REG (-10V) IN
A29 REG (-10V) IN
B29 REG (-10V) IN
FB3
TP20
+10V (A)
+5V (A)
-10V (A)
CN17
A | | B
D-GND | 1 | D-GND
NC | 2 | D-GND
D-GND | 3 | NC
REG (+5V) IN | 4 | REG (+5V) IN
5
6
7
8
9
10
11
12
13 | GND
14
15
16 | B. B. (N) OUT
17
HD OUT | 18
19
20
21
HD2 | 22 | V. BLK
23
VD OUT | 24 | B. B. (S) OUT
C. PUL OUT | 25 | C. BLK OUT
REG (+10V) IN | 26 | REG (+10V) IN
REG (+10V) IN | 27 | REG (+10V) IN
REG (-10V) IN | 28 | REG (-10V) IN
REG (-10V) IN | 29 | REG (-10V) IN
A-GND | 30 | A-GND
TP12
V BLKG OUT B22 → F KY-99
TP4
FIELD PULSE OUT A22 → A22 TG-25
TP3
VD OUT A24 → A24
R120 220
TP13
BLKG OUT B25 → B25
TG-25
WP-18
EF-16
TP2
R28 51
J3 C BLKG OUT
TP17
RV7 50
HD OUT (1) A18 → A18 WP-18
C47 10 16V
R73 1k
R75 560
C85 15p
R118 5600
R74 2200
TP14
CLAMP OUT A25 → A25 TG-25 WP-18 EF-16
R76 75
J4 B. B. OUT-1
R77 75
J5 B. B. OUT-2
B. B. (S) OUT B24 → B24 TG-25 WP-18 EF-16
RV1: H PHASE
RV5: BURST LEVEL
RV6: SYNC LEVEL
RV7: DC ADJ
RV2: R LEVEL
RV3: G LEVEL
RV4: B LEVEL
RV8: CW LEVEL
RV10: CW LEVEL
SG-115 BOARD
HDS-1000 (W W)

WP-18 BOARD
Component side



1-620-514-11 COMPONENT SIDE

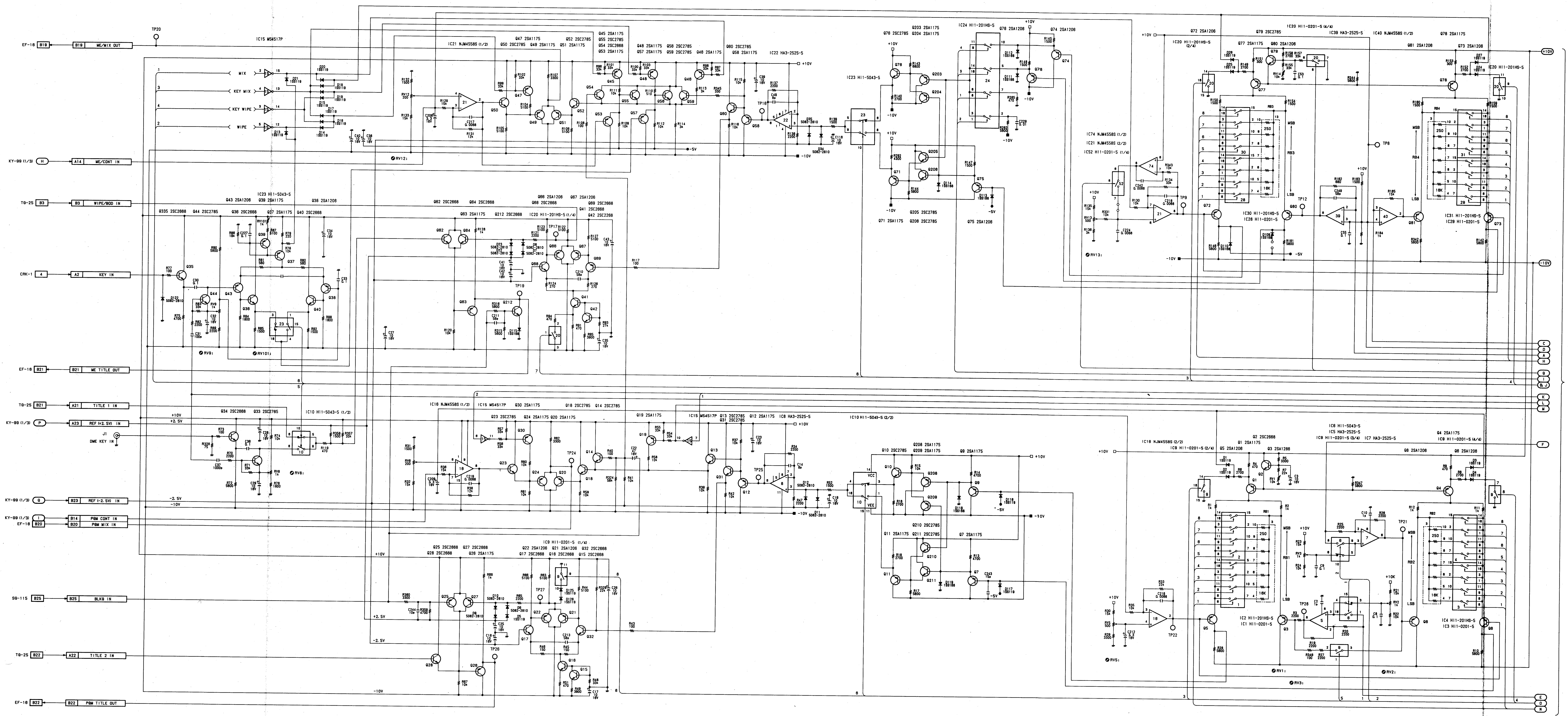


1-620-514-11 COMPONENT SIDE

WP-18 1-620-514-11

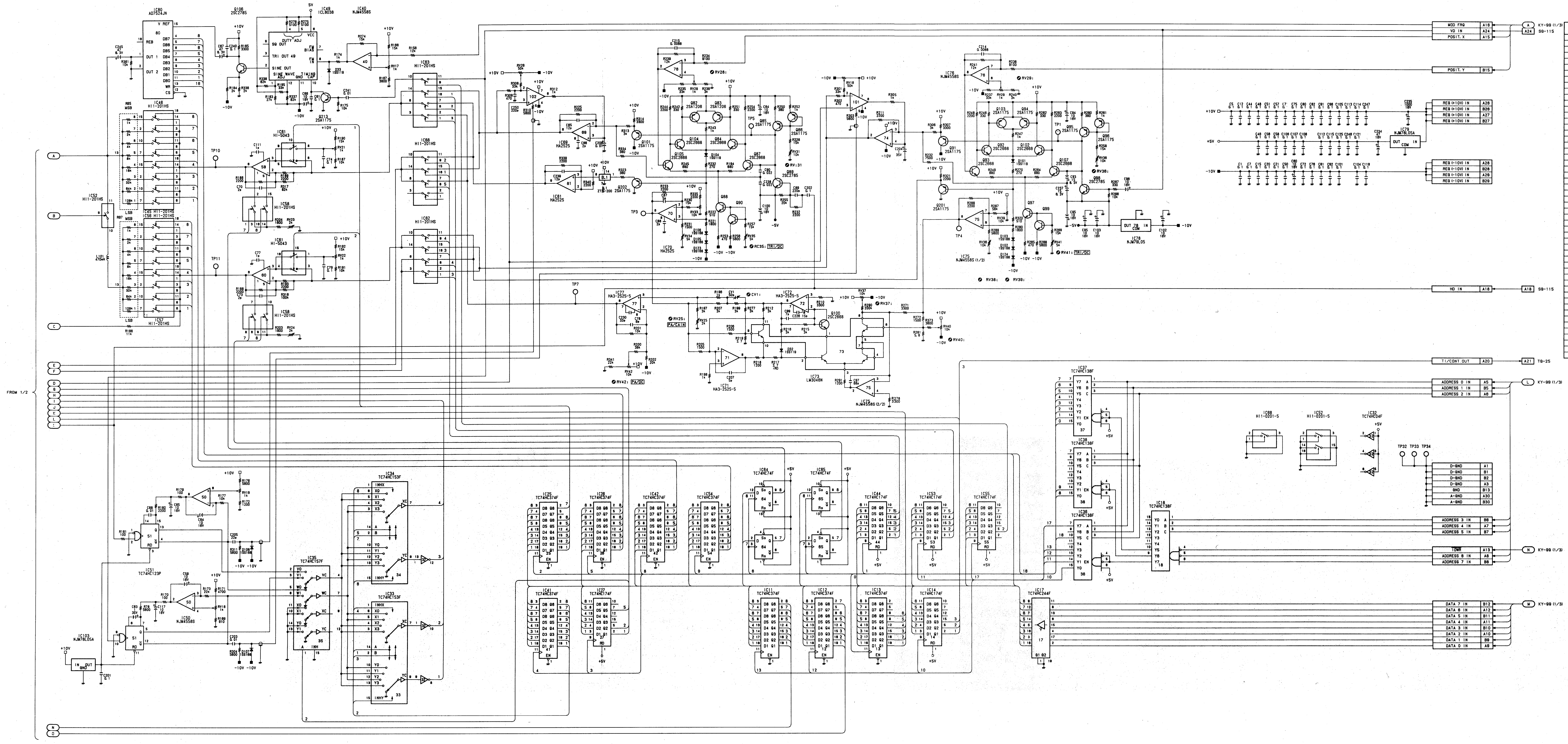
CV1	A-13
D1	A-1
D2	A-1
D3	A-1
D4	A-1
D5	A-3
D6	A-3
D7	B-5
D8	B-5
D9	A-4
D10	A-4
D11	A-4
D13	B-4
D14	B-4
D15	B-4
D16	B-4
D17	B-4
D18	B-4
D19	B-4
D20	B-4
D21	B-4
D22	B-5
D23	B-5
D24	B-8
D25	B-8
D26	A-8
D27	A-8
D32	A-15
D33	A-10
D34	A-6
D35	A-6
D101	B-16
D102	B-15
D103	B-15
D104	B-15
D105	B-15
D106	B-14
D107	A-11
D108	A-11
D109	B-9
D110	B-7
D111	A-7
D112	A-8
D113	B-7
D114	A-8
D115	B-4
D116	B-2
D117	A-1
D118	B-2
D119	A-2
D122	B-5
D123	B-15
D124	B-15
D125	A-3
D126	A-3
DL1	B-13
IC1	C-1
IC2	B-1
IC3	C-2
IC4	B-2
IC5	A-1
IC6	A-1
IC7	A-1
IC8	A-2
IC9	A-3
IC10	A-3
IC11	C-2
IC12	C-2
IC13	C-3
IC14	B-3
IC15	B-3
IC16	B-3
IC17	C-4
IC18	C-4
IC20	A-6
IC21	B-7
IC22	A-7
IC23	A-6
IC24	A-7
IC25	C-8
IC26	C-9
IC27	C-9
IC28	B-8
IC29	B-9
IC30	B-9
IC31	B-9
IC32	A-8
IC33	A-8
IC34	A-8
IC35	A-9
IC36	B-7
IC37	B-7
IC38	C-8
IC39	A-9
IC40	A-10
IC41	C-10
IC42	C-10
IC44	C-12
IC45	B-10
IC46	B-10
IC47	B-11
IC48	B-11
IC49	A-11
IC50	A-10
IC51	A-11
IC52	B-12
IC53	C-12
IC54	C-11
IC55	C-12
IC56	B-11
IC57	B-12
IC58	B-12
IC59	A-12
IC60	A-12
IC61	A-13
IC62	A-12
IC63	A-13
IC64	C-13
IC65	C-13
IC68	B-14
IC69	B-14
IC70	B-14
IC71	A-14
IC72	A-14
IC73	A-15
IC74	A-15
IC75	A-16
IC76	C-16
IC77	A-14
IC78	A-16
IC79	C-5
IC80	B-12
IC81	C-14
IC101	A-14
IC102	B-14
IC103	A-12
Q1	B-1
Q2	B-1
Q2	B-1
Q4	A-1
Q5	B-1
Q6	B-1
Q7	A-1
Q8	A-2
Q9	B-2
Q10	B-2
Q11	A-2
Q12	B-3
Q13	B-3
Q14	B-3
Q15	A-3
Q16	A-3
Q17	A-3
Q18	B-3
Q19	B-3
Q20	B-3
Q21	B-3
Q22	B-4
Q23	B-4
Q24	B-4
Q25	B-4
Q26	A-4
Q27	A-4
Q28	A-4
Q29	A-4
Q30	B-4
Q31	B-3
Q32	A-3
Q33	A-4
Q34	A-4
Q35	A-5
Q36	A-5
Q37	A-5
Q38	A-5
Q39	A-5
Q40	A-5
Q41	A-6
Q42	A-6
Q43	A-5
Q44	A-5
Q45	B-4
Q46	B-4
Q47	B-5
Q48	B-5
Q49	B-5
Q50	B-5
Q51	B-5
Q52	B-5
Q53	B-5
Q54	B-5
Q55	B-5
Q56	B-6
Q57	B-6
Q58	B-6
Q59	B-6
Q60	B-6
Q62	A-4
Q63	B-4
Q64	A-4
Q66	B-5
Q67	B-5
Q68	A-5
Q69	B-5
Q70	A-7
Q71	A-7
Q72	B-7
Q73	B-7
Q74	B-8
Q75	B-8
Q76	A-8
Q77	B-8
Q78	A-8
Q79	A-8
Q80	A-9
Q81	A-9
Q82	C-15
Q83	B-15
Q84	C-15
Q85	B-15
Q86	B-15
Q87	B-15
Q88	B-15
Q89	B-15
Q90	B-15
Q91	B-15
Q92	C-16
Q93	C-16
Q94	B-16
Q95	B-16
Q96	B-16
Q97	B-16
Q98	B-16
Q99	B-16
Q100	A-15
Q101	B-15
Q102	C-16
Q103	A-12
Q104	C-15
Q105	C-15
Q106	B-11
Q107	B-16
Q201	A-16
Q202	B-15
Q203	A-7
Q204	A-7
Q205	A-7
Q206	A-7
Q208	B-2
Q209	B-2
Q210	A-2
Q211	A-2
Q212	B-4
Q213	A-10
RB1	B-1
RB2	B-2
RB3	B-8
RB4	B-9
RB5	B-10
RB7	B-11
RV1	A-1
RV2	A-1
RV3	A-2
RV5	B-2
RV6	B-3
RV8	A-4
RV9	A-5
RV12	B-6
RV13	B-7
RV14	B-8
RV16	A-14
RV17	B-10
RV18	A-10
RV19	A-10
RV21	B-12
RV22	B-13
RV23	C-13
RV24	C-13
RV25	A-13
RV26	C-14
RV28	C-14
RV29	C-16
RV31	B-15
RV33	B-15
RV34	B-15
RV35	B-15
RV36	B-15
RV37	A-16
RV38	A-16
RV39	A-16
RV40	A-16
RV41	B-16
RV42	A-13
RV101	A-5
TP1	B-15
TP3	B-14
TP4	A-16
TP5	C-15
TP7	A-14
TP8	A-9
TP9	B-7
TP10	B-12
TP11	B-12
TP12	B-9
TP16	B-6
TP17	B-5
TP19	B-4
TP20	B-6
TP21	A-2
TP22	B-1
TP24	C-7
TP25	B-3
TP26	A-4
TP27	B-3
TP28	A-1
TP32	B-6
TP33	A-5
TP34	C-15

WP-18 (1/2) BOARD
WIPE PATTERN GEN


EF-16 B19 → B19 ME/MIX OUT
TP20
IC15 M54517P
MIX
KEY MIX
KEY WIPE
WIPE
KY-99 (1/3) H → A14 ME/CONT IN
TG-25 B3 → B3 WIPE/BOD IN
IC23 H11-5043-5
CRK-1 4 → A2 KEY IN
RV9
RV101
RV12
EF-16 B21 ← B21 ME TITLE OUT
TG-25 B21 → A21 TITLE 1 IN
KY-99 (1/3) P → A23 REF (+2.5V) IN
J1 DME KEY IN
IC10 H11-5043-5 (1/2)
RV8
KY-99 (1/3) Q → B23 REF (-2.5V) IN
KY-99 (1/3) I → B14 PGM CONT IN
EF-16 B20 → B20 PGM MIX IN
SG-115 B25 → B25 BLKG IN
TG-25 B22 → A22 TITLE 2 IN
EF-16 B22 ← B22 PGM TITLE OUT
+10V
+2.5V
-2.5V
-10V
TO 3/2

WP-18 (1/2) BOARD
HDS-1000 (W W)

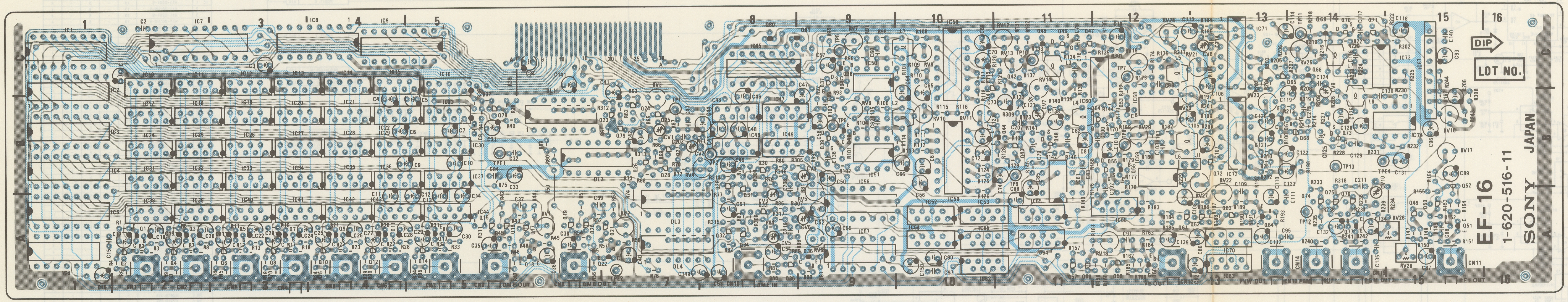
WP-18 (2/2) BOARD
WIPE PATTERN GEN


IC80 AD7524JN
IC48 HI1-201HS
IC57 HI1-201HS
IC56 HI1-201HS
IC52 HI1-201HS
IC81 HI1-5043
IC61 HI1-5043
IC58 HI1-201HS
IC49 ICL8038
IC40 NJM4558S
IC83 HI1-201HS
IC88 HI1-201HS
IC82 HI1-201HS
IC89 HA2525
IC59 HA2525
IC70 HA2525
IC76 NJM4558S
IC75 NJM4558S (1/2)
IC78 NJM78L05
IC79 NJM78L05A
IC77 HA3-2525-S
IC72 HA3-2525-S
IC71 HA3-2525-S
IC73 LM3046N
NJM4558S (2/2)
IC51 TC74HC123P
IC50 NJM4558S
IC103 NJM78L05A
IC32 TC74HC157F
IC34 TC74HC153F
IC33 TC74HC153F
IC25 TC74HC374F
IC26 TC74HC374F
IC42 TC74HC374F
IC54 TC74HC374F
IC84 TC74HC74F
IC85 TC74HC74F
IC44 TC74HC174F
IC53 TC74HC174F
IC55 TC74HC174F
IC41 TC74HC374F
IC27 TC74HC374F
IC11 TC74HC374F
IC12 TC74HC374F
IC13 TC74HC174F
IC14 TC74HC174F
IC17 TC74HC244F
IC37 TC74HC138F
IC38 TC74HC138F
IC36 TC74HC138F
IC18 TC74HC138F
IC88 HI1-0201-5
IC52 HI1-0201-5
IC32 TC74HC04F
TP32 TP33 TP34
FROM 1/2
MOD FRQ IN A18
VD IN A24
POSIT. X A15
POSIT. Y B15
A KY-99 (1/3)
A24 SG-115
REB (+10V) IN A28
REB (+10V) IN B28
REB (+10V) IN A27
REB (+10V) IN B27
REB (-10V) IN A29
REB (-10V) IN B26
REB (-10V) IN A26
REB (-10V) IN B29
HD IN A18
A18 SG-115
TI/CONT OUT A20
A21 TG-25
ADDRESS 0 IN A5
ADDRESS 1 IN B5
ADDRESS 2 IN A6
L KY-99 (1/3)
D-GND A1
D-GND B1
D-GND B2
D-GND A3
GND B13
A-GND A30
A-GND B30
ADDRESS 3 IN B6
ADDRESS 4 IN A7
ADDRESS 5 IN B7
IOWR A13
ADDRESS 6 IN A8
ADDRESS 7 IN B8
N KY-99 (1/3)
DATA 7 IN B12
DATA 6 IN A12
DATA 5 IN B11
DATA 4 IN A11
DATA 3 IN B10
DATA 2 IN A10
DATA 1 IN B9
DATA 0 IN A9
M KY-99 (1/3)
+10V
+5V
-10V
RV26 RV28 RV29 RV31 RV36 RV38 RV39 RV40 RV41 RV42 RV25 RV37 RC35 CV11
TRI/DC
PA/CA1N
PA/DC
TP1 TP3 TP4 TP5 TP7 TP10 TP11
MSB LSB

REF NO	DESCRPTION	PIN NO				
		+10V	+5V	GND	-5V	-10V
IC 1	HI1-0201-5	13	–	5	–	4
2	HI1-201HS-5	13	–	5	–	4
3	HI1-0201-5	13	–	5	–	4
4	HI1-201HS-5	13	–	5	–	4
5	HA3-2525-5	7	–	–	–	4
6	HI1-5043-5	11	–	13	–	14
7	HA3-2525-5	7	–	–	–	4
8	HA3-2525-5	7	–	–	–	4
9	HI1-0201-5	13	–	5	–	4
10	HI1-5043-5	11	–	13	–	14
15	TC74HC123P	–	16	–	8	–
16	NJM4558S	1, 9	–	–	–	5
20	HI1-0201-5	13	–	5	–	4
21	NJM4558S	1, 9	–	–	–	5
22	HA3-2525-5	7	–	–	–	4
23	HI1-5043-5	11	–	13	–	14
24	HI1-201HS-5	13	–	5	–	4
28	HI1-0201-5	13	–	5	–	4
29	HI1-0201-5	13	–	5	–	4
30	HI1-201HS-5	13	–	5	–	4
31	HI1-201HS-5	13	–	5	–	4
39	HA3-2525-5	7	–	–	–	4
40	NJM-4558S	1, 9	–	–	–	5
45	HI1-0201-5	13	–	5	–	4
48	HI1-201HS-5	13	–	5	–	4
49	ICL8038BCJD	6	–	11	–	–
50	NJM4558S	1, 9	–	–	–	5
51	TC74HC123P	–	16	–	8	–
52	HI1-0201-5	13	–	5	–	4
56	HI1-201HS-5	13	–	5	–	4
57	HI1-0201-5	13	–	5	–	4
58	HI1-0201-5	13	–	5	–	4
59	HA3-2525-5	7	–	–	–	4
60	HA3-2525-5	7	–	–	–	4
61	HI1-5043-5	11	–	13	–	14
62	HI1-201HS-5	13	–	5	–	4
63	HI1-201HS-5	13	–	5	–	4
68	HI1-0201-5	13	–	5	–	4
69	HA3-2525-5	7	–	–	–	4
70	HA3-2525-5	7	–	–	–	4
71	HA3-2525-5	7	–	–	–	4
72	HA3-2525-5	7	–	–	–	4
73	LM3046N	–	–	–	–	–
74	NJM4558S	1, 9	–	–	–	5
75	NJM4558S	1, 9	–	–	–	5
76	NJM4558S	1, 9	–	–	–	5
77	HA3-2525-5	7	–	–	–	4
78	NJM78L05A	–	–	–	–	–
79	NJM78L05A	–	–	–	–	–
80	AD7524JN	–	14	3	–	–
81	HA3-2525-5	7	–	–	–	4
101	CA3080E	7	–	–	–	4
102	CA3080E	7	–	–	–	4
103	NJM78L05A	–	–	–	–	–

WP-18 (2/2) BOARD
HDS-1000 (W W)

EF-16 BOARD
Component side


1
2
3
4
5
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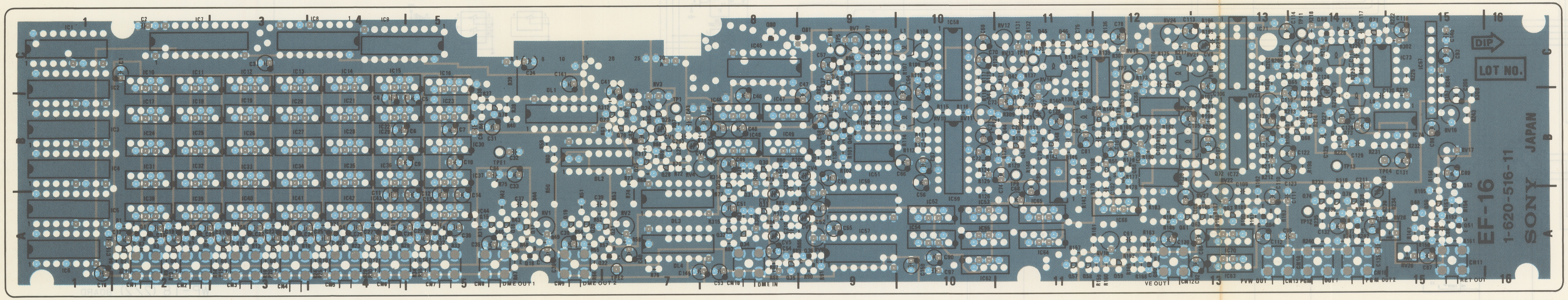
7
8
9
10
11
12
13
14
15
16
A
B
C
DIP
LOT NO.
EF-16
1-620-516-11
SONY
JAPAN
DME OUT 1
DME OUT 2
DME IN
VE OUT
PVW OUT
PGM OUT
RET OUT

1-620-516-11 COMPONENT SIDE


1
2
3
4
5
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7
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9
10
11
12
13
14
15
16
A
B
C
DIP
LOT NO.
EF-16
1-620-516-11
SONY
JAPAN
DME OUT 1
DME OUT 2
DME IN
VE OUT
PVW OUT
PGM OUT
RET OUT

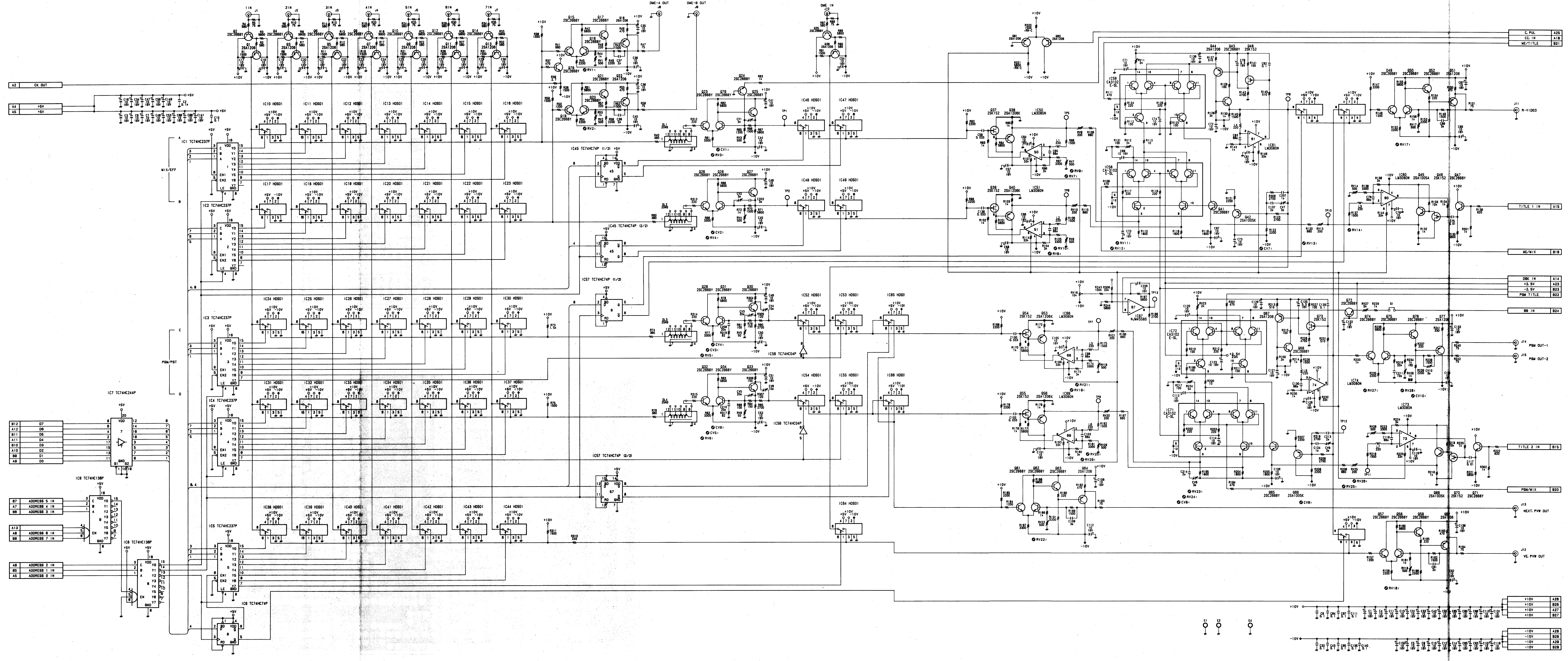
1-620-516-11 COMPONENT SIDE

EF-16 1-620-516-11

CN1	A-2
CN2	A-2
CN3	A-3
CN4	A-3
CN5	A-4
CN6	A-4
CN7	A-5
CN8	A-5
CN9	A-6
CN10	A-8
CN11	A-15
CN12	A-12
CN13	A-13
CN14	A-14
CN15	A-14
DL1	B-6
DL2	B-6
DL3	A-7
DL4	A-7
CV1	B-7
CV2	B-7
CV3	A-8
CV4	B-9
CV5	A-8
CV6	A-9
CV7	B-11
CV8	C-13
CV9	B-14
CV10	A-14
IC1	C-1
IC2	C-1
IC3	B-1
IC4	B-1
IC5	A-1
IC6	A-1
IC7	C-2
IC8	C-4
IC9	C-4
IC10	C-2
IC11	C-2
IC12	C-3
IC13	C-3
IC14	C-4
IC15	C-4
IC16	C-5
IC17	B-2
IC18	B-2
IC19	B-3
IC20	B-3
IC21	B-4
IC22	B-4
IC23	B-5
IC24	B-2
IC25	B-2
IC26	B-3
IC27	B-3
IC28	B-4
IC29	B-4
IC30	B-5
IC31	B-2
IC32	B-2
IC33	B-3
IC34	B-3
IC35	B-4
IC36	B-4
IC37	B-5
IC38	B-2
IC39	B-2
IC40	B-3
IC41	B-3
IC42	B-4
IC43	B-4
IC44	B-5
IC45	C-8
IC46	B-8
IC47	B-8
IC48	B-8
IC49	B-8
IC50	C-9
IC51	B-9
IC52	A-10
IC53	A-10
IC54	A-10
IC55	A-10
IC56	A-9
IC57	A-9
IC58	C-10
IC59	B-10
IC60	C-12
IC61	B-11
IC62	A-10
IC63	A-13
IC64	A-11
IC65	A-11
IC66	A-12
IC67	C-15
IC68	B-12
IC69	B-12
IC70	A-13
IC71	C-13
IC72	B-13
IC73	C-14
IC74	B-15
Q1	A-2
Q2	A-2
Q3	A-2
Q4	A-2
Q5	A-3
Q6	A-3
Q7	A-3
Q8	A-3
Q9	A-4
Q10	A-4
Q11	A-4
Q12	A-4
Q13	A-5
Q14	A-5
Q15	A-5
Q16	A-5
Q17	A-6
Q18	A-6
Q19	A-6
Q20	A-6
Q21	A-7
Q22	A-7
Q23	B-7
Q24	B-7
Q25	B-7
Q26	B-7
Q27	B-7
Q28	B-7
Q29	B-8
Q30	B-8
Q31	A-8
Q32	A-8
Q33	A-8
Q34	A-8
Q35	A-8
Q36	A-9
Q37	C-9
Q38	C-9
Q39	B-9
Q40	B-9
Q41	C-11
Q42	C-11
Q43	B-11
Q44	B-11
Q45	C-11
Q46	C-11
Q47	C-11
Q48	B-11
Q49	A-15
Q50	A-15
Q51	A-15
Q52	A-15
Q53	B-12
Q54	B-12
Q55	B-12
Q56	B-12
Q57	A-11
Q58	A-11
Q59	A-12
Q60	A-12
Q61	A-12
Q62	A-13
Q63	A-13
Q64	A-13
Q65	C-13
Q66	C-14
Q67	B-13
Q68	B-14
Q69	C-14
Q70	C-14
Q71	C-14
Q72	B-13
Q73	B-14
Q74	A-14
Q75	A-14
Q76	A-14
Q77	A-14
Q78	B-5
Q79	B-7
Q80	C-8
Q81	C-9
RV1	A-6
RV2	A-7
RV3	B-7
RV4	B-8
RV5	A-9
RV6	A-9
RV7	C-9
RV8	B-9
RV9	C-10
RV10	B-10
RV11	B-10
RV12	C-11
RV13	C-11
RV14	C-11
RV16	B-15
RV17	B-15
RV18	A-12
RV19	C-12
RV20	B-13
RV21	C-13
RV22	A-13
RV23	B-13
RV24	C-12
RV25	C-14
RV26	A-15
RV27	B-13
RV28	A-15
RV29	B-12
TP1	B-7
TP2	B-8
TP5	C-9
TP6	B-9
TP7	C-12
TP8	B-12
TP9	B-11
TP10	C-11
TP11	C-14
TP12	A-14
TP13	B-14
TPE1	B-5
TPE2	A-7
TPE4	B-15

EF-16 BOARD

R-VIDEO EFFECT
G-VIDEO EFFECT
B-VIDEO EFFECT

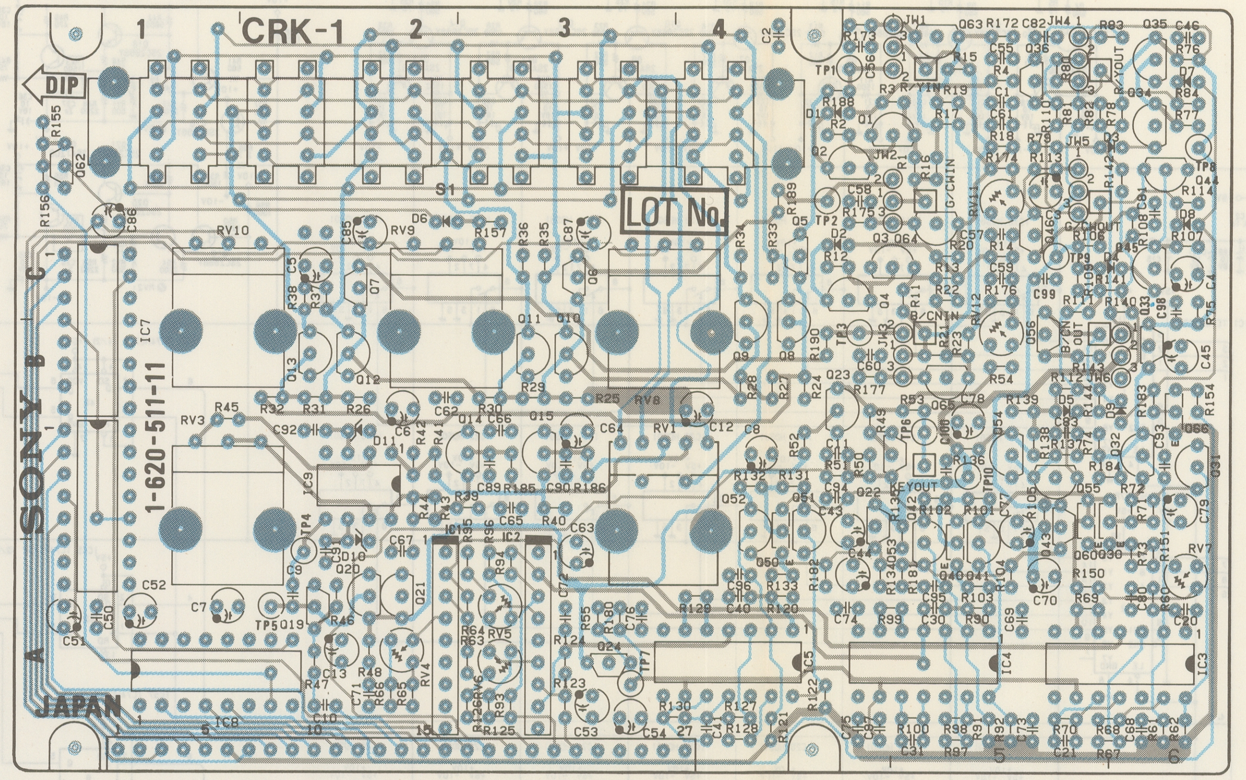

CK OUT
IC1 TC74HC237P
IC2 TC74HC237P
IC3 TC74HC237P
IC4 TC74HC237P
IC5 TC74HC237P
IC6 TC74HC74P
IC7 TC74HC244P
IC8 TC74HC138P
IC9 TC74HC138P
ADDRESS 5 IN
ADDRESS 4 IN
ADDRESS 3 IN
ADDRESS 8 IN
ADDRESS 7 IN
ADDRESS 2 IN
ADDRESS 1 IN
ADDRESS 0 IN
HD901
DME-A OUT
DME-B OUT
DME IN
LA3080M
R-VIDEO
TITLE 1 IN
ME/MIX
DSK IN
+2.5V
-2.5V
PGM TITLE
BB IN
PGM OUT-1
PGM OUT-2
TITLE 2 IN
PGM/MIX
NEXT PVW OUT
VS PVW OUT
C.PUL
CC. IN
ME/TITLE
+10V
-10V

A		B
GND	1	GND
CK/OUT	2	GND
GND	3	NC
+5V	4	+5V
A0	5	A1
A2	6	A3
A4	7	A5
A6	8	A7
D0	9	D1
D2	10	D3
D4	11	D5
D6	12	D7
$\overline{\text{ICW}}$	13	GND
DSK	14	
BC-1R	15	BC-2R
	16	
	17	
CC. IN	18	
	19	ME/MIX
	20	PGM/MIX
	21	ME/TITLE
	22	PGM/TITLE
+2.5V	23	-2.5V
VD	24	B.B
C.PUL	25	BLK
+10V	26	+10V
+10V	27	+10V
-10V	28	-10V
-10V	29	-10V
GND	30	GND

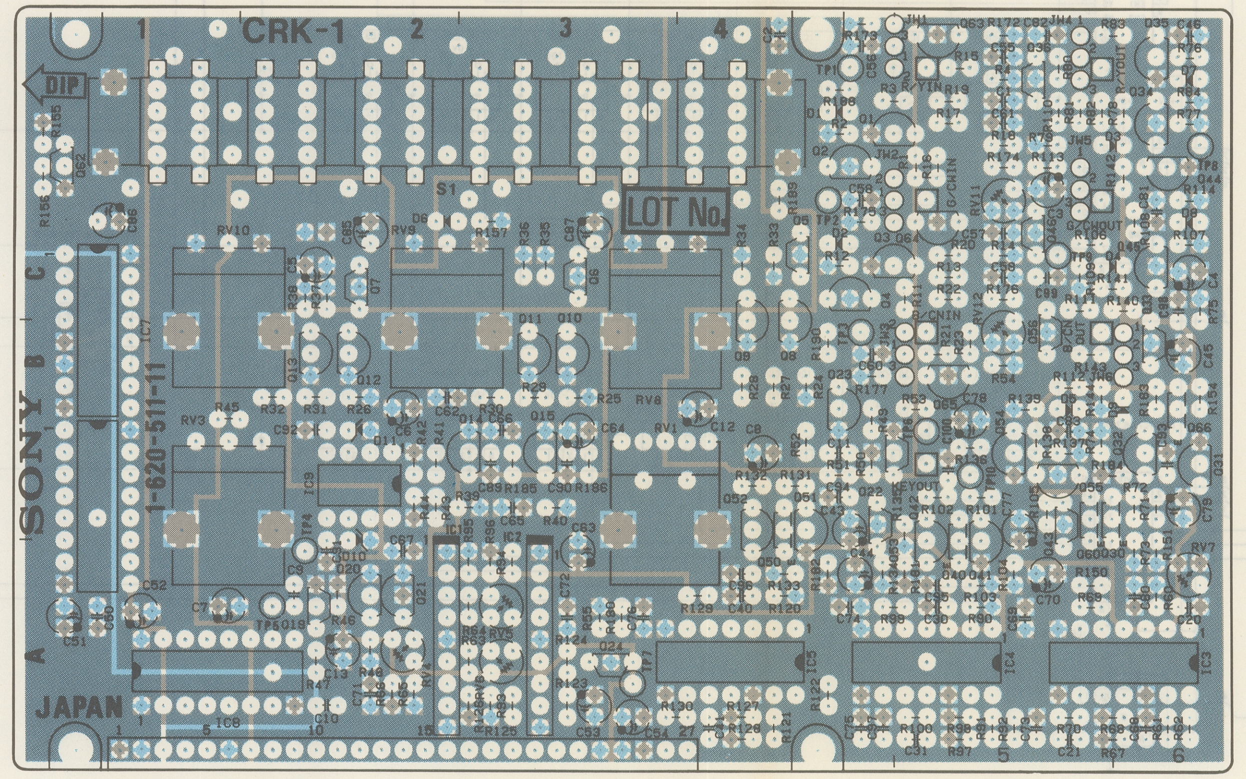
EF-16 BOARD
HDS-1000 (W W)

CRK-1 BOARD

Component side


CRK-1
1
2
3
4
DIP
LOT No
SONY
1-620-511-11
JAPAN
A
B
C

1-620-511-11 COMPONENT SIDE

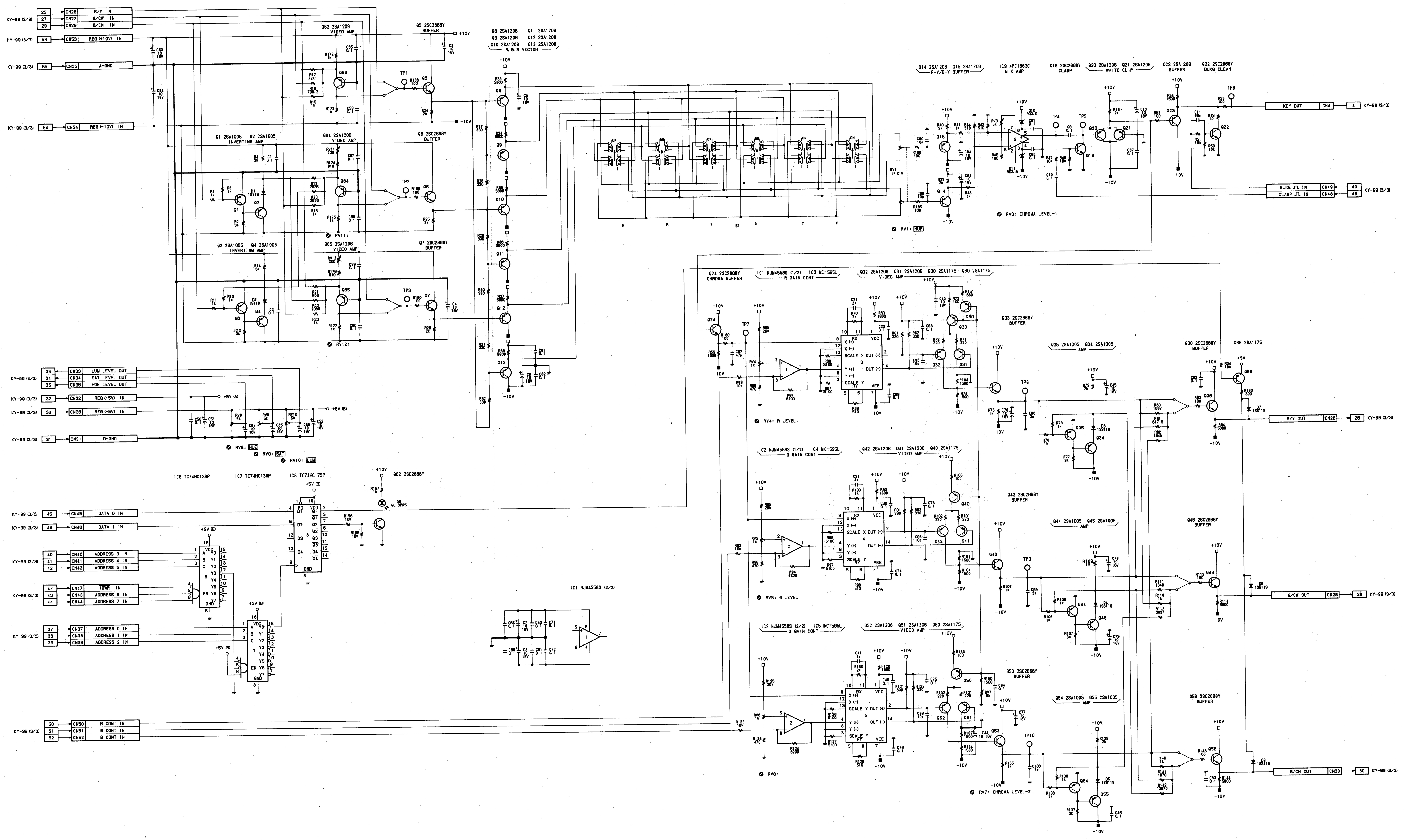

CRK-1
1
2
3
4
DIP
LOT No
SONY
1-620-511-11
JAPAN
A
B
C

1-620-511-11 COMPONENT SIDE

CRK-1 1-620-511-11

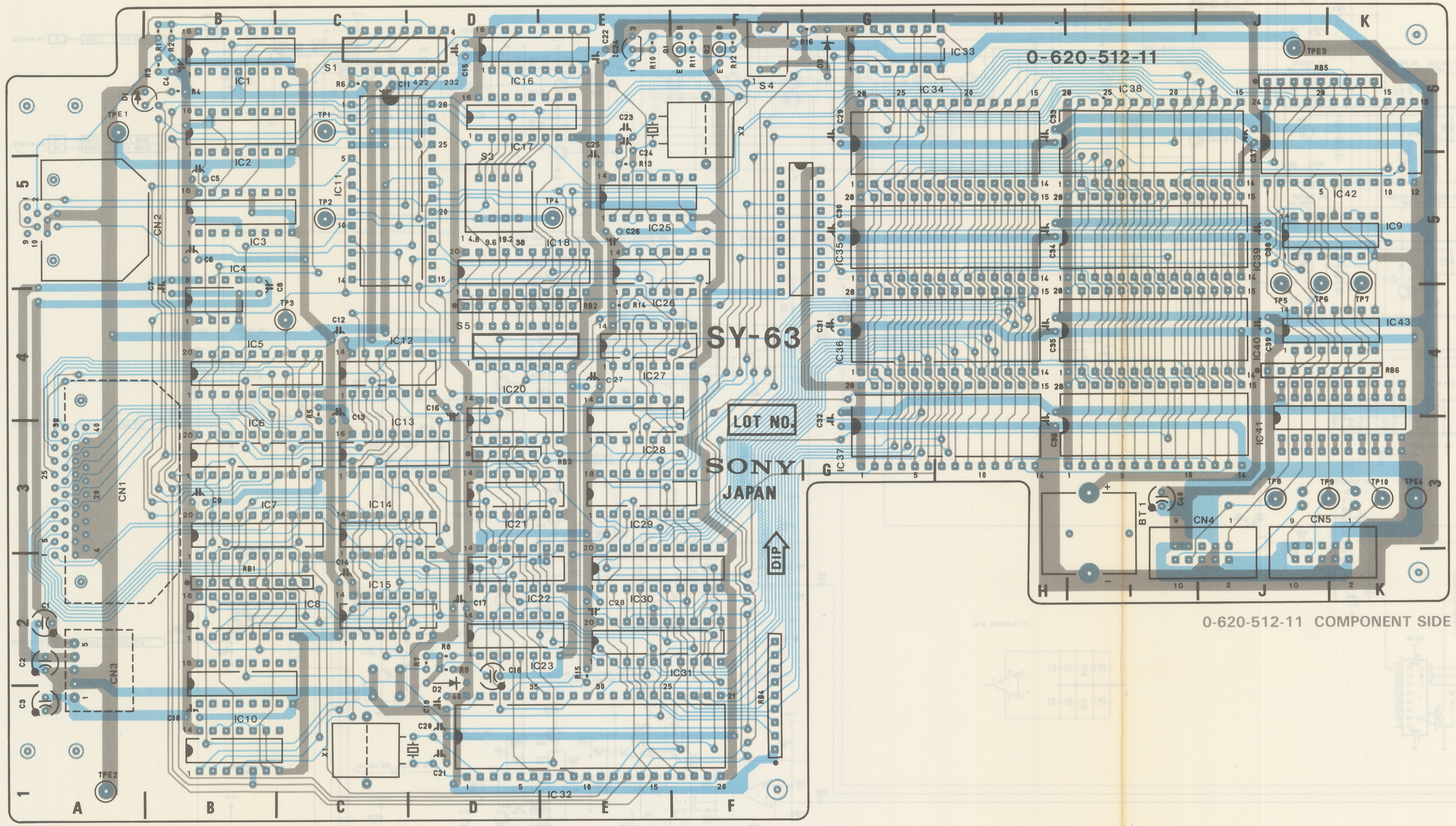
CN1	A-2	Q41	A-5
		Q42	A-5
D1	C-4	Q43	B-5
D2	C-4	Q44	C-6
D3	C-5	Q45	C-6
D4	C-5	Q46	C-5
D5	B-5	Q50	B-4
D6	B-5	Q51	B-4
D7	C-6	Q52	B-4
D8	C-6	Q53	B-4
D9	B-5	Q54	B-5
D10	B-2	Q55	B-5
D11	B-2	Q56	B-5
		Q60	B-5
IC1	A-2	Q62	C-1
IC2	A-3	Q63	C-5
IC3	A-6	Q64	C-5
IC4	A-5	Q65	B-5
IC5	A-4	Q66	B-6
IC6	B-1		
IC7	B-1	RV1	B-3
IC8	A-1	RV3	B-1
IC9	B-2	RV4	A-2
		RV5	A-3
Q1	C-4	RV6	A-3
Q2	C-4	RV7	A-6
Q3	C-4	RV8	C-3
Q4	C-4	RV9	C-2
Q5	C-4	RV10	C-1
Q6	C-3	RV11	C-5
Q7	C-2	RV12	B-5
Q8	B-4		
Q9	B-4	S1	C-2
Q10	B-3		
Q11	B-3	TP1	C-4
Q12	B-2	TP2	C-4
Q13	B-2	TP3	B-4
Q14	B-3	TP4	A-2
Q15	B-3	TP5	A-2
Q19	A-2	TP6	B-5
Q20	A-2	TP7	A-3
Q21	A-2	TP8	C-6
Q22	B-4	TP9	C-5
Q23	B-4	TP10	B-5
Q24	A-3		
Q30	B-6		
Q31	B-6		
Q32	B-6		
Q33	C-6		
Q34	C-6		
Q35	C-6		
Q36	C-5		
Q40	A-5		

CRK-1 BOARD
CHROMA KEY SIGNAL GEN


KY-99 (3/3)
CN25 R/Y IN
CN27 B/CW IN
CN29 B/CN IN
CN53 REG (+10V) IN
CN55 A-GND
CN54 REG (-10V) IN
CN33 LUM LEVEL OUT
CN34 SAT LEVEL OUT
CN35 HUE LEVEL OUT
CN32 REG (+5V) IN
CN36 REG (+5V) IN
CN31 D-GND
CN45 DATA 0 IN
CN46 DATA 1 IN
CN40 ADDRESS 3 IN
CN41 ADDRESS 4 IN
CN42 ADDRESS 5 IN
CN47 TOWR IN
CN43 ADDRESS 6 IN
CN44 ADDRESS 7 IN
CN37 ADDRESS 0 IN
CN38 ADDRESS 1 IN
CN39 ADDRESS 2 IN
CN50 R CONT IN
CN51 G CONT IN
CN52 B CONT IN
Q83 2SA1208 VIDEO AMP
Q5 2SC2688Y BUFFER
Q1 2SA1005 Q2 2SA1005 INVERTING AMP
Q84 2SA1208 VIDEO AMP
Q6 2SC2688Y BUFFER
Q3 2SA1005 Q4 2SA1005 INVERTING AMP
Q85 2SA1208 VIDEO AMP
Q7 2SC2688Y BUFFER
Q8 2SA1208 Q11 2SA1208
Q9 2SA1208 Q12 2SA1208
Q10 2SA1208 Q13 2SA1208
R & B VECTOR
RV8: HUE
RV9: SAT
RV10: LUM
RV11
RV12
IC8 TC74HC138P
IC7 TC74HC138P
IC6 TC74HC175P
Q82 2SC2688Y
IC1 NJM4558S (2/2)
Q14 2SA1208 Q15 2SA1208 R-Y/B-Y BUFFER
IC9 μPC1883C MIX AMP
Q19 2SC2688Y CLAMP
Q20 2SA1208 Q21 2SA1208 WHITE CLIP
Q23 2SA1208 BUFFER
Q22 2SC2688Y BLKG CLEAN
KEY OUT CN4
BLKG J'L IN CN49
CLAMP J'L IN CN48
RV1: MIX
RV3: CHROMA LEVEL-1
Q24 2SC2688Y CHROMA BUFFER
IC1 NJM4558S (1/2) IC3 MC1595L R GAIN CONT
Q32 2SA1208 Q31 2SA1208 Q30 2SA1175 Q80 2SA1175 VIDEO AMP
Q33 2SC2688Y BUFFER
Q35 2SA1005 Q34 2SA1005 AMP
Q38 2SC2688Y BUFFER
Q86 2SA1175
R/Y OUT CN26
RV4: R LEVEL
IC2 NJM4558S (1/2) IC4 MC1595L G GAIN CONT
Q42 2SA1208 Q41 2SA1208 Q40 2SA1175 VIDEO AMP
Q43 2SC2688Y BUFFER
Q44 2SA1005 Q45 2SA1005 AMP
Q48 2SC2688Y BUFFER
B/CW OUT CN28
RV5: G LEVEL
IC2 NJM4558S (2/2) IC5 MC1595L B GAIN CONT
Q52 2SA1208 Q51 2SA1208 Q50 2SA1175 VIDEO AMP
Q53 2SC2688Y BUFFER
Q54 2SA1005 Q55 2SA1005 AMP
Q58 2SC2688Y BUFFER
B/CN OUT CN30
RV6
RV7: CHROMA LEVEL-2
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
+10V
-10V
+5V

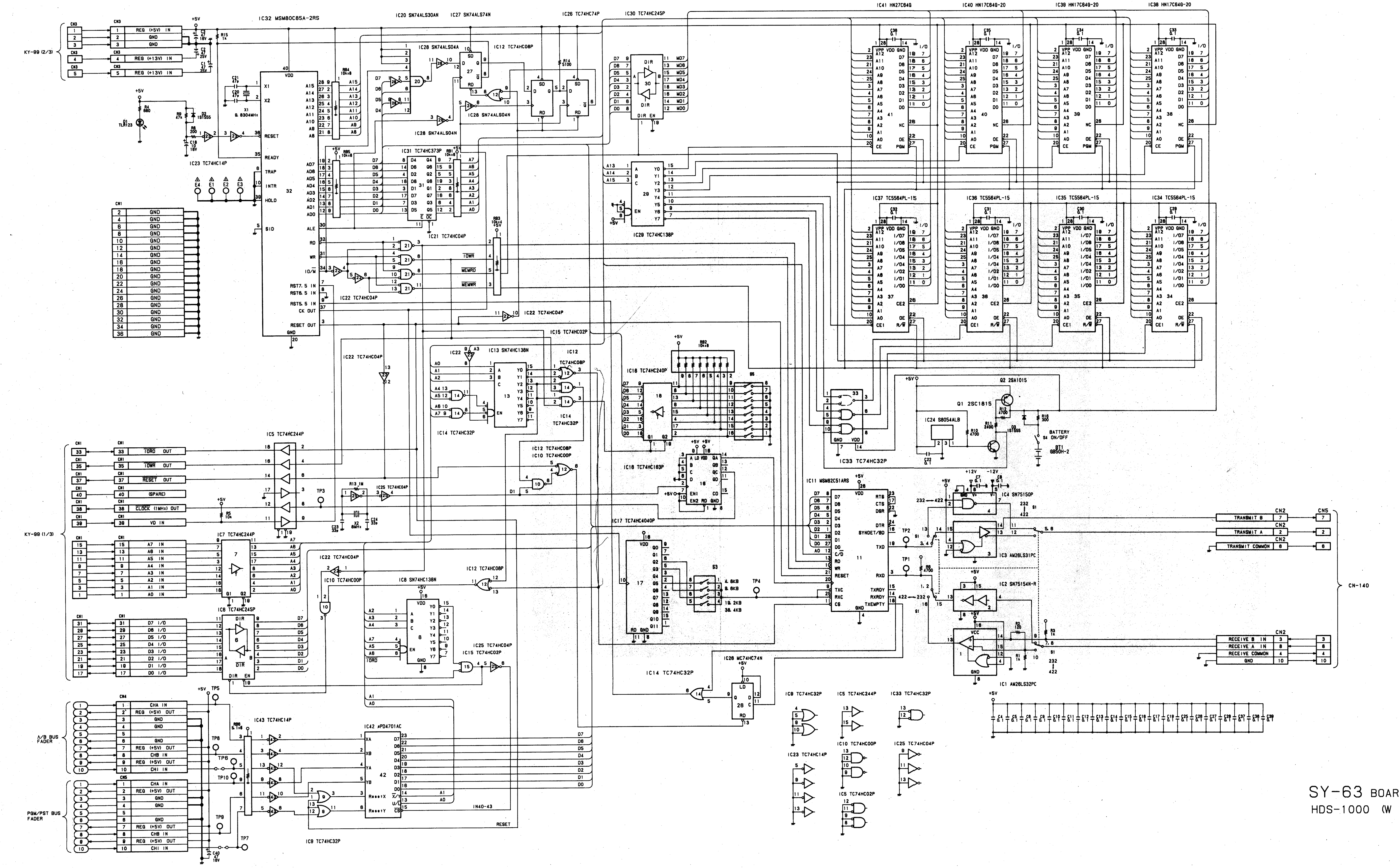
CRK-1 BOARD
HDS-1000 (W W)

SY-63 BOARD
Component side


0-620-512-11
SY-63
LOT NO.
SONY
JAPAN
DIP
A
B
C
D
E
F
G
H
J
K
1
2
3
4
5
6
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC20
IC21
IC22
IC23
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
IC36
IC37
IC38
IC41
IC42
IC43
CN1
CN2
CN3
CN4
CN5
S1
S3
S4
S5
X1
X2
BT1
TPE1
TPE2
TPE4
TPE5
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
RB1
RB2
RB3
RB4
RB5
RB6

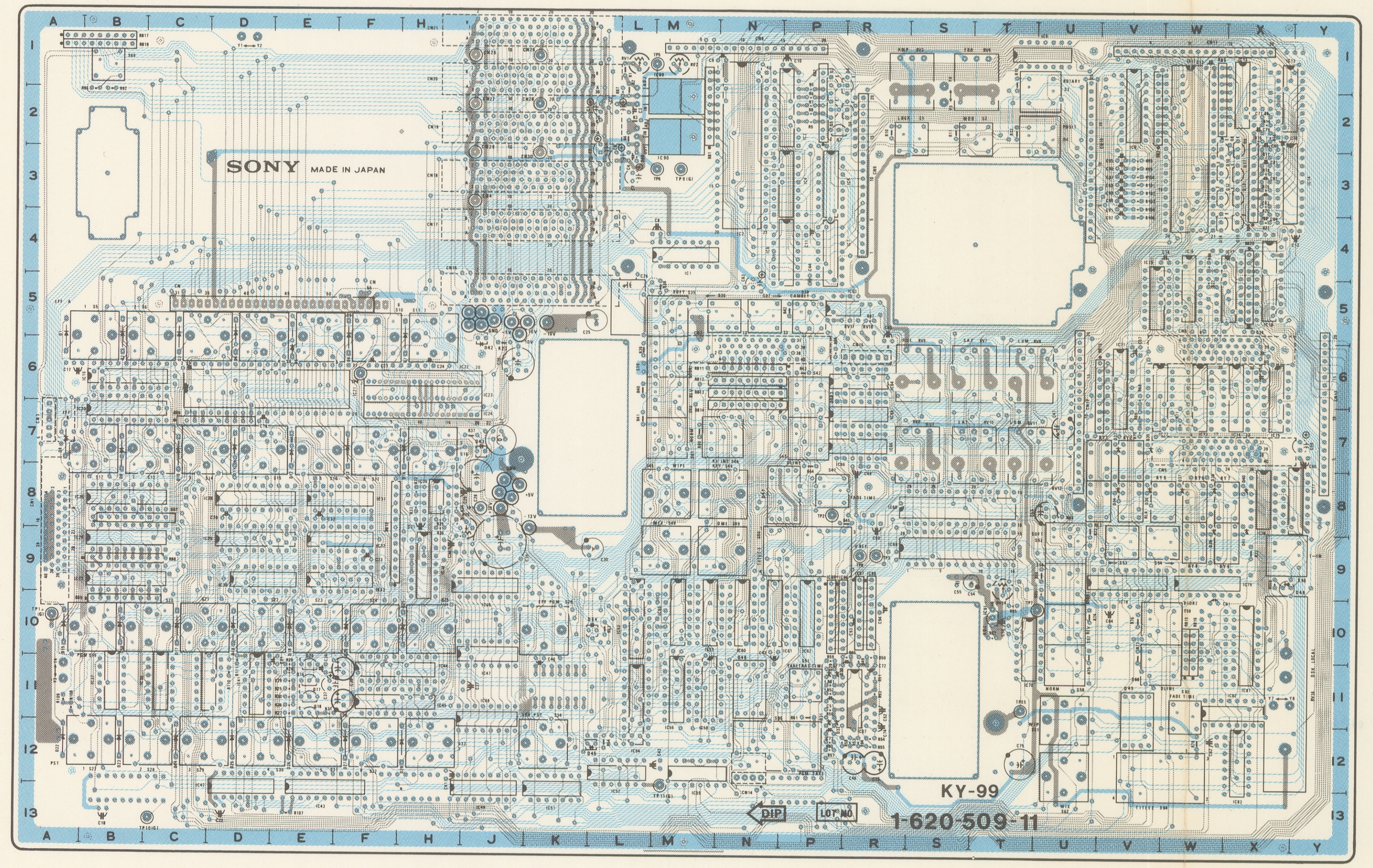
0-620-512-11 COMPONENT SIDE

SY-63 BOARD
SYSTEM CONTROLER

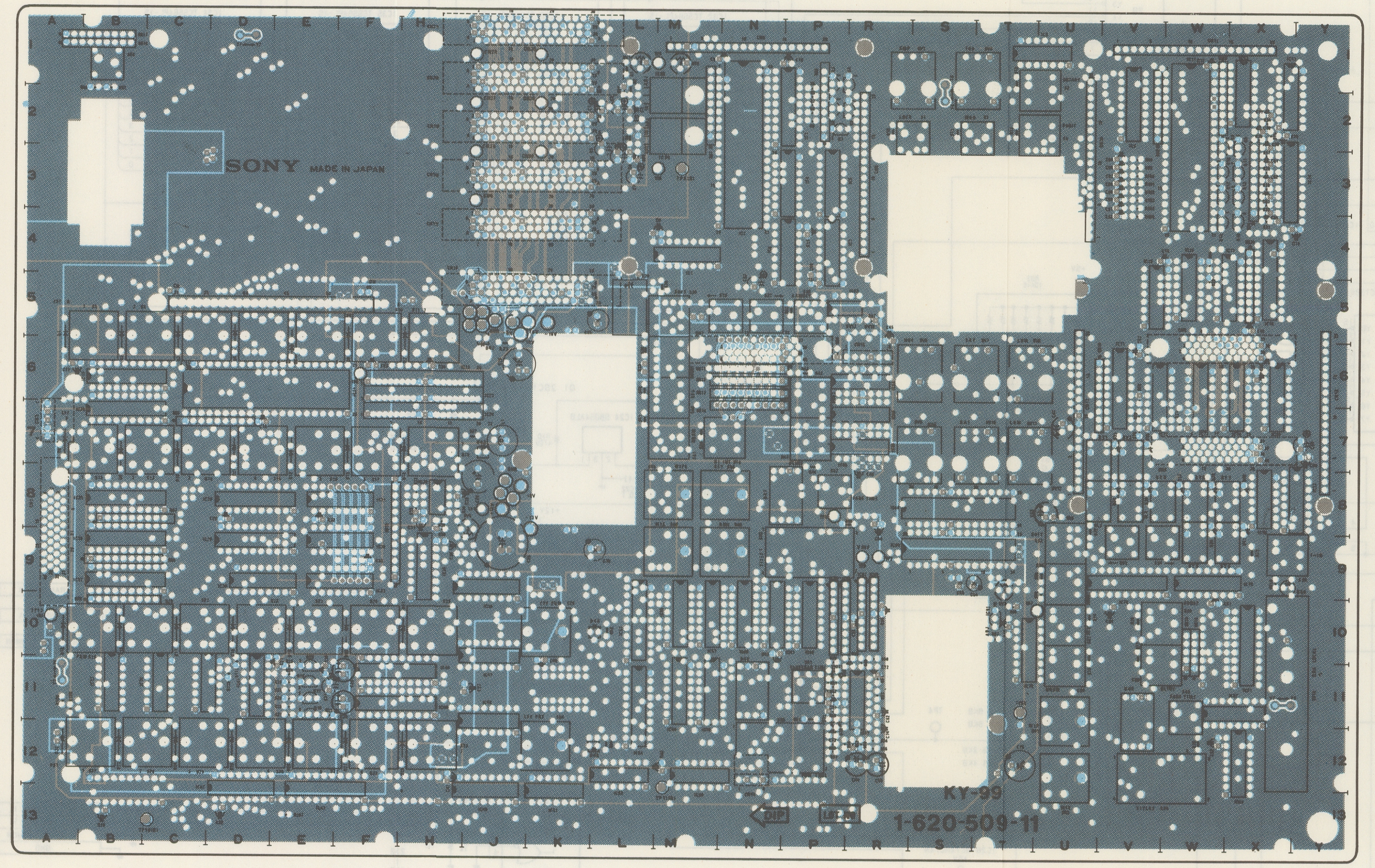

KY-99 (2/3)
KY-99 (1/3)
IC32 MSM80C85A-2RS
CN-140
X/S BUS FADER
PGM/PST BUS FADER
BATTERY
Q1 2SC1815
Q2 2SA1015
TRANSMIT B
TRANSMIT A
TRANSMIT COMMON
RECEIVE B IN
RECEIVE A IN
RECEIVE COMMON
GND
RESET

SY-63 BOARD
HDS-1000 (W W)

KY-99 BOARD
Component side



1-620-509-11 COMPONENT SIDE



1-620-509-11 COMPONENT SIDE

KY-99 1-620-509-11

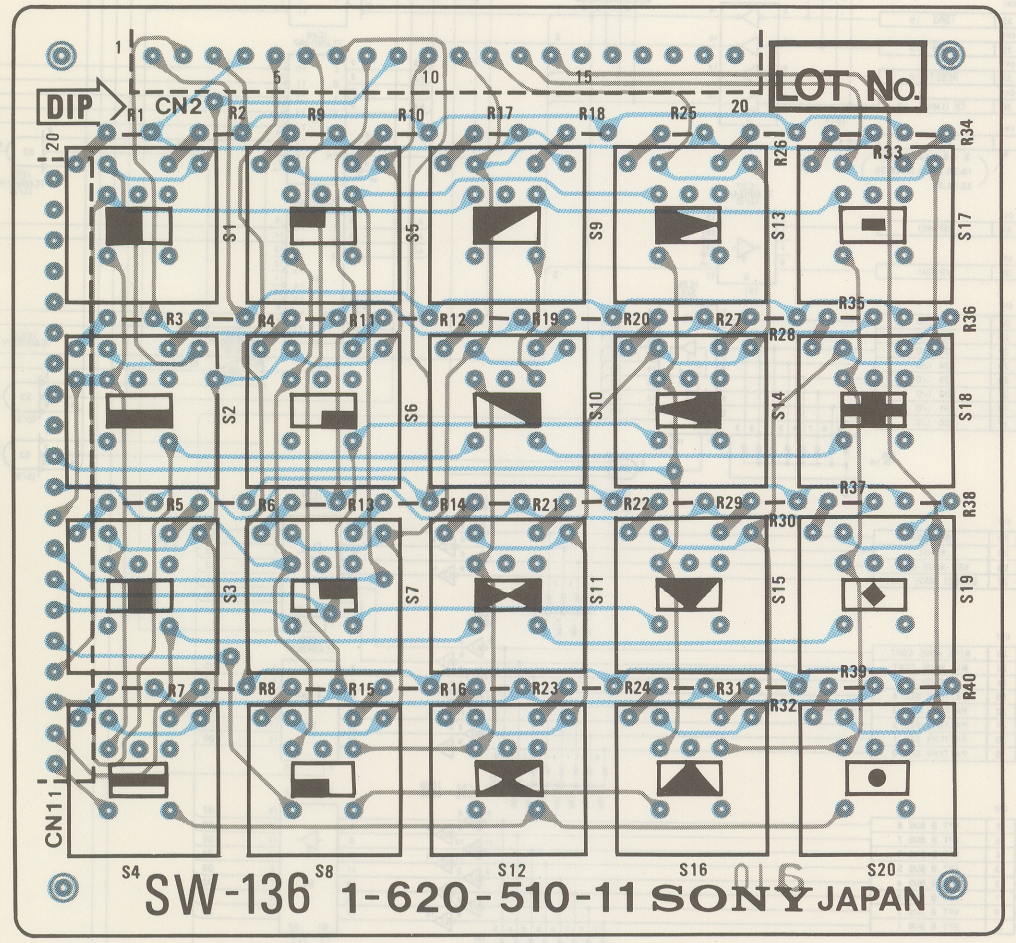
CN1	A-9
CN3	A-7
CN4	J-3
CN5	W-7
CN6	W-6
CN7	N-6
CN8	N-1
CN9	R-3
CN10	U-3
CN11	W-1
CN12	U-7
CN13	Y-7
CN14	N-12
CN15	R-6
CN16	K-5
CN17	K-4
CN18	K-3
CN19	K-2
CN20	K-1
CN21	K-1
CN25	J-1
CN26	K-1
CN27	J-2
CN28	K-2
CN29	J-3
CN30	K-3
CN31	C-5
CN32	C-5
CN33	C-5
CN34	C-5
CN35	C-5
CN36	D-5
CN37	D-5
CN38	D-5
CN39	D-5
CN40	D-5
CN41	D-5
CN42	D-5
CN43	D-5
CN44	E-5
CN45	E-5
CN46	E-5
CN47	E-5
CN48	E-5
CN49	E-5
CN50	E-5
CN51	F-5
CN52	F-5
CN53	F-5
CN54	F-5
CN55	D-5
D1	A-5
D2	B-5
D3	C-5
D4	D-5
D5	E-6
D8	A-7
D9	B-7
D6	F-6
D7	H-6
D10	C-7
D11	D-7
D12	E-7
D13	F-7
D14	H-7
D15	A-7
D16	B-7
D17	C-7
D18	D-7
D19	E-7
D20	F-7
D21	H-7
D22	A-12
D23	B-12
D24	C-12
D25	D-12
D26	E-12
D27	F-12
D28	H-12
D29	P-11
D30	P-11
D31	P-11
D32	P-11
D33	V-7
D34	V-8
D35	V-7
D36	V-8
D37	W-8
D38	W-8
D39	W-9
D40	X-8
D41	X-9
D42	J-6
D43	J-7
D44	L-10
D45	L-12
D46	X-9
D47	P-8
D48	N-11
D49	V-11
IC1	M-4
IC2	N-2
IC3	P-2
IC4	P-3
IC5	P-3
IC6	P-4
IC7	P-4
IC8	U-1
IC9	V-2
IC11	W-2
IC12	X-1
IC13	X-2
IC14	X-3
IC15	V-5
IC16	W-5
IC17	X-5
IC18	X-5
IC19	B-6
IC20	B-7
IC21	E-6
IC22	H-6
IC23	H-6
IC24	H-7
IC25	B-8
IC26	B-9
IC27	B-9
IC28	D-8
IC29	D-9
IC30	D-9
IC31	F-8
IC32	F-9
IC33	F-9
IC34	H-9
IC35	H-8
IC36	J-9
IC37	B-11
IC39	C-11
IC41	D-11
IC42	D-12
IC43	E-12
IC44	F-11
IC45	F-11
IC47	J-10
IC48	J-11
IC49	J-12
IC51	K-12
IC52	L-12
IC53	L-10
IC54	L-11
IC55	M-10
IC56	M-11
IC57	M-10
IC58	M-11
IC59	M-12
IC60	N-10
IC61	N-10
IC62	P-10
IC63	P-5
IC64	R-6
IC65	R-7
IC66	R-7
IC67	R-11
IC68	S-8
IC69	S-9
IC70	T-10
IC71	V-6
IC72	V-6
IC73	W-6
IC74	X-6
IC75	X-6
IC76	X-8
IC77	Y-8
IC78	V-9
IC79	W-9
IC81	X-10
IC82	X-12
IC83	X-12
IC85	P-10
IC86	P-10
IC87	R-10
IC88	R-10
IC89	M-2
IC90	M-2
IC91	T-10
Q3	P-1
Q4	P-1
Q5	P-2
Q6	P-2
Q7	P-2
Q8	W-2
Q9	X-2
Q10	W-3
Q11	X-3
Q12	W-3
Q13	X-3
Q14	W-4
Q15	W-3
Q16	E-11
Q17	E-11
Q18	E-11
Q20	E-11
RB1	M-2
RB2	P-2
RB3	V-2
RB4	X-3
RB5	D-7
RB6	W-2
RB7	B-8
RB8	B-9
RB9	B-10
RB10	F-9
RB11	N-6
RB12	N-6
RB13	N-6
RB14	N-7
RB15	W-10
RB16	W-10
RB17	B-1
RB18	B-1
RB19	U-6
RB20	X-5
RV1	L-1
RV2	M-1
RV3	S-1
RV4	T-1
RV5	J-9
RV6	S-6
RV7	T-6
RV8	U-6
RV9	S-7
RV10	T-7
RV11	U-7
RV12	V-8
RV14	T-9
RV16	X-11
RV17	R-5
RV18	R-5
RY1	U-7
RY2	V-7
RY3	U-8
RY4	V-8
RY5	W-8
RY6	W-8
RY7	X-8
RY8	W-9
RY9	X-9
S1	S-2
S2	T-2
S3	U-2
S4	U-2
S5	B-5
S6	C-5
S7	C-5
S8	D-5
S9	E-5
S10	F-5
S11	H-5
S12	B-7
S13	C-7
S14	C-7
S15	D-7
S16	E-7
S17	F-7
S18	H-7
S19	B-10
S20	C-10
S21	C-10
S22	D-10
S23	E-10
S24	F-10
S25	H-10
S26	K-10
S27	B-12
S28	C-12
S29	C-12
S30	D-12
S31	E-12
S32	F-12
S33	H-12
S34	K-12
S35	M-5
S36	N-5
S37	N-5
S38	P-5
S39	M-6
S40	M-6
S41	M-7
S42	P-6
S43	P-6
S44	N-6
S45	M-8
S46	M-8
S47	P-8
S48	M-9
S49	N-9
S50	P-9
S51	P-11
S52	U-9
S53	V-9
S54	W-9
S55	X-9
S56	U-9
S57	U-10
S58	U-11
S59	V-10
S60	V-11
S61	U-11
S62	U-12
S63	W-11
S64	W-12
S65	N-12
S66	B-1
TP1	J-8
TP2	P-8
TP3	R-9
TP4	F-6
TP5	M-1
TP6	M-3
TP7	U-10
TP8	R-9
TP9	M-3
TP10	C-13
TP11	M-12
TP13	A-10
TPE5	T-11
VDR1	R-7
VDR2	R-7

KY-99 (1/3) BOARD
KEY/DISPLAY CONTPOLLER

SY-63
CN-140
C. CONT
BACK. C
MOD FRQ
DSK GAIN
TITLE FAD
CONT
POSIT
REG (+10V)
REG (+5V)
REG (+2.5V)
D-GND
REG (-2.5V)
REG (-5V)
REG (-10V)
D0~D7
A0~A7
IO WR
V BLKG
V D
ADJ
KY-99 (3/3)
LUM LEVEL
HUE LEVEL
SAT LEVEL
REG (+5V)
IO WR
IO RD
RESET
CK
RESET
A0~A7
8279 ② CS
8279 ③ CS
D0~D7
ADC ① CS
ADC ② CS
REG (+5V)
IN SA RD EOC
OUT SC VE CONT WR
IN SC VE CONT RD
KY-99 (2/3)
COL CAN B CONT
COL CAN G CONT
COL CAN R CONT
TP4
FADE TIME TITLE-1
FADE TIME TITLE-2
TRANS TIME TAKE
TP10 TP11 TP12

KY-99 (1/3) BOARD
HDS-1000 (W W)

SW-136 BOARD
Component side


DIP
CN2
LOT No.
CN1
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
SW-136 1-620-510-11 SONY JAPAN

1-620-510-11 COMPONENT SIDE

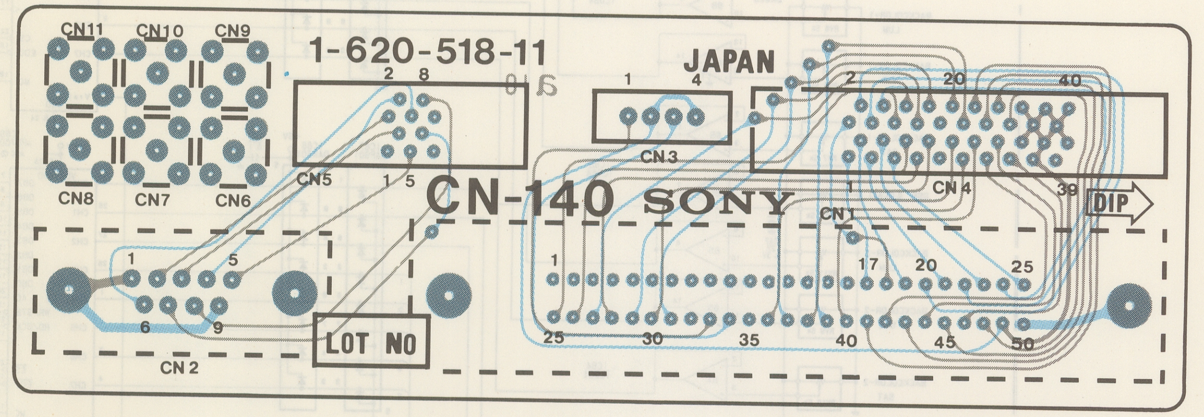
KY-99 (2/3) BOARD
SW-136 BOARD

KEY/DISPLAY CONTROLLER

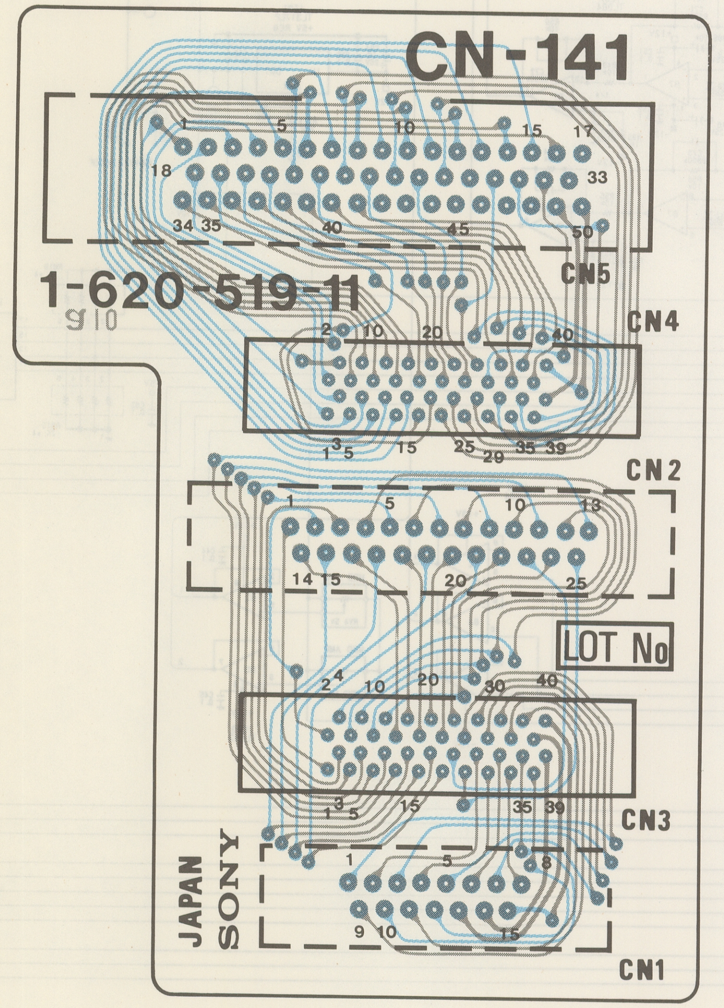
KY-99 (2/3) BOARD
SW-136 BOARD
HDS-1000 (W W)

CN-140 BOARD
CN-141 BOARD
CN-176 BOARD

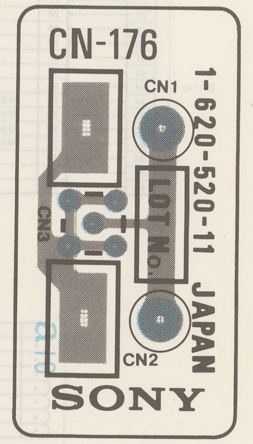
Component side


CN11
CN10
CN9
CN8
CN7
CN6
1-620-518-11
JAPAN
CN5
CN3
CN4
CN-140 SONY
CN1
DIP
CN 2
LOT NO

1-620-518-11 COMPONENT SIDE


CN-141
1-620-519-11
CN5
CN4
CN2
LOT No
CN3
CN1
JAPAN
SONY

1-620-519-11 COMPONENT SIDE


CN-176
CN1
CN2
1-620-520-11
JAPAN
LOT No.
SONY

1-620-520-11 COMPONENT SIDE

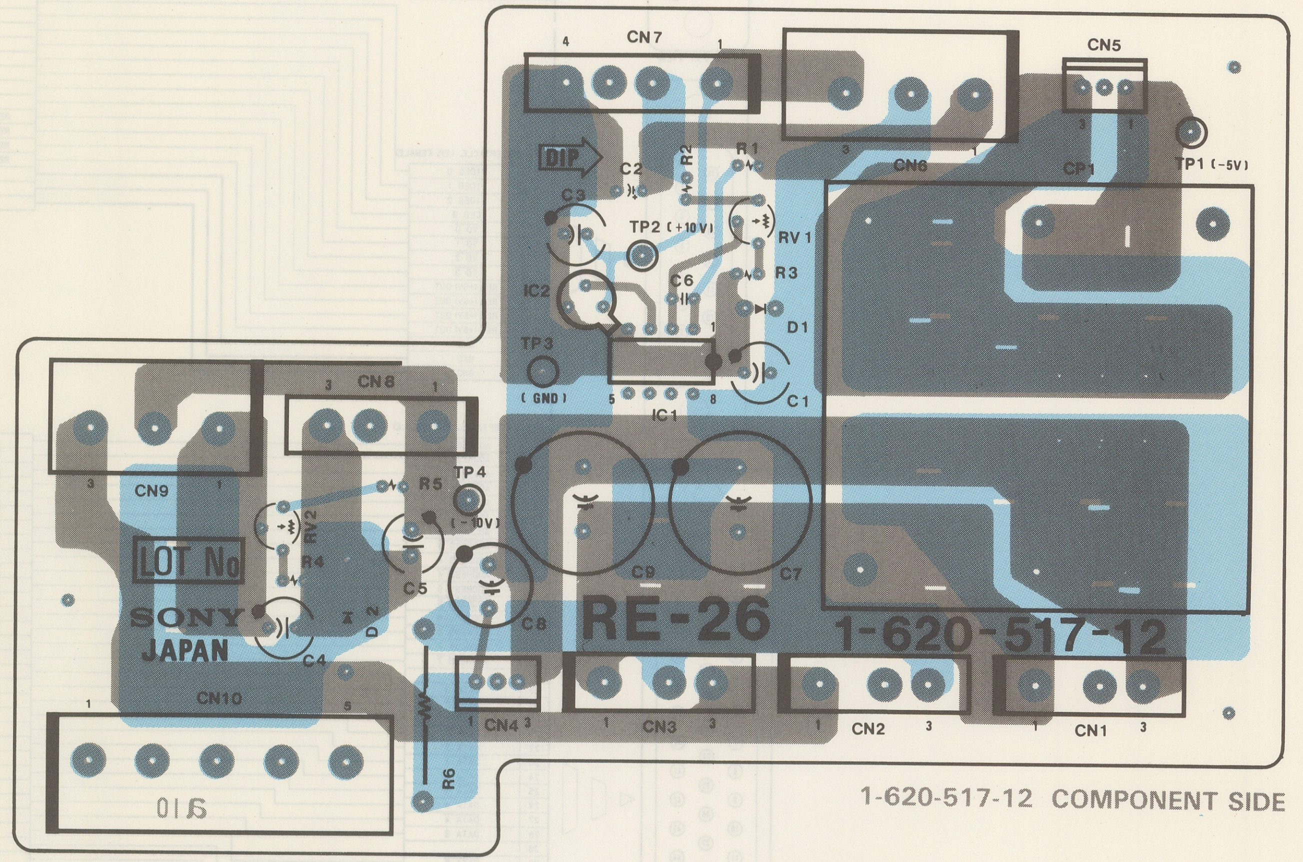
FRAME
CN-140 BOARD
CN-141 BOARD
CN-176 BOARD
CONNECTION BOARD
KY-99 (3/3) BOARD
KEY/DISPLAY CONTROLLER

CN-141
KY-99(1/3 & 2/3)
KY-99(3/3)
EF-16(R)
EF-16(G)
EF-16(B)
WP-18
SG-115
TG-25
CRK-1
CN-176
SY-63
CN-140

FRAME WIRING
CN-140 BOARD
CN-141 BOARD
CN-176 BOARD
KY-99 (3/3) BOARD
HDS-1000 (W, W)

POWER ASSY FRAME, RE-26

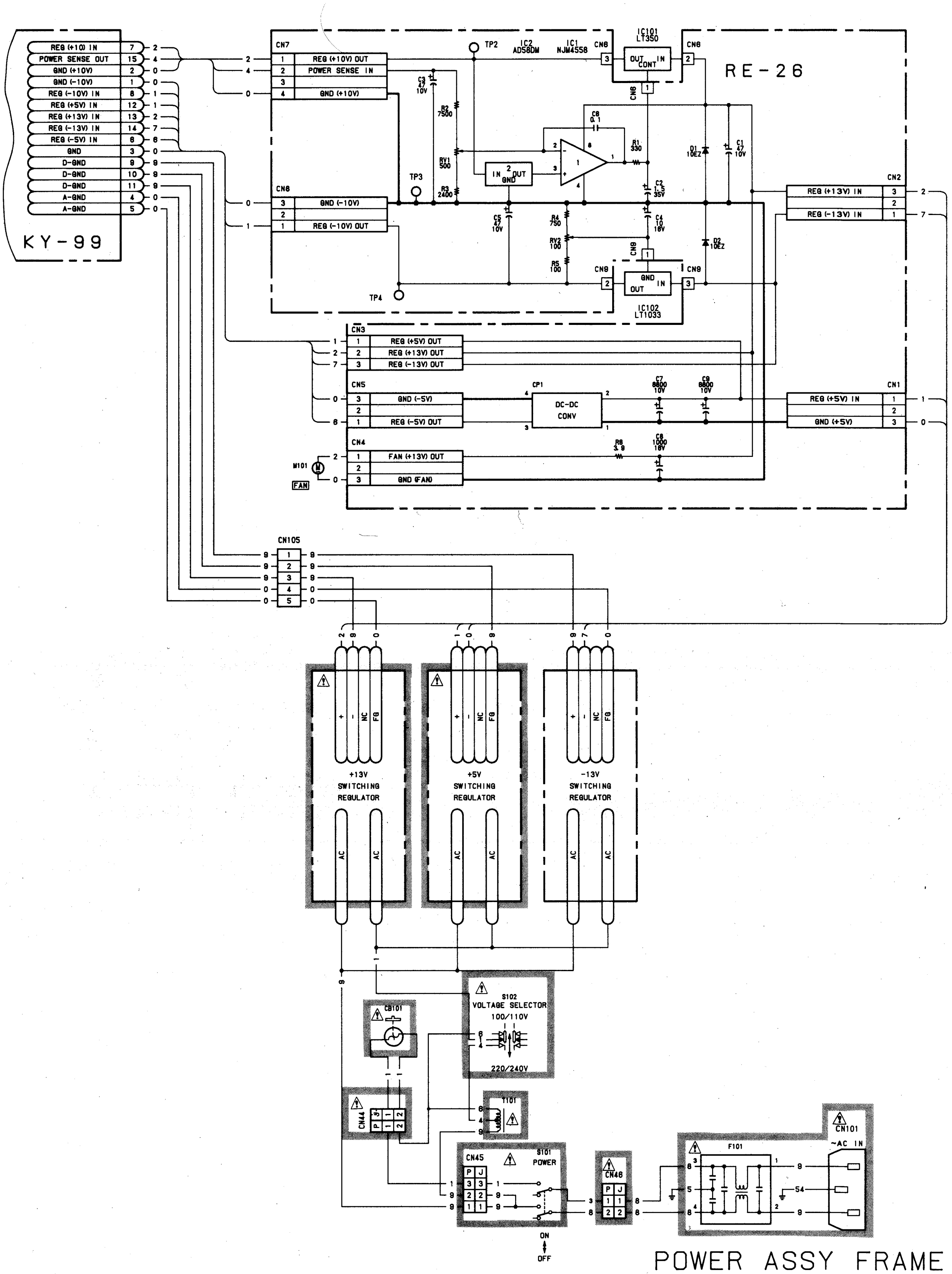
RE-26 BOARD
Component side



4
CN7
1
CN5
3
1
TP1 (-5V)
DIP
C2
R2
R1
CN6
CP1
C3
TP2 (+10V)
RV1
R3
C6
IC2
D1
TP3
(GND)
5
IC1
8
C1
3
CN8
1
TP4
R5
(-10V)
CN9
RV2
R4
C5
LOT No
C9
C7
C8
SONY
JAPAN
D2
C4
RE-26
1-620-517-12
CN10
5
CN4
CN3
CN2
CN1
R6

1-620-517-12 COMPONENT SIDE

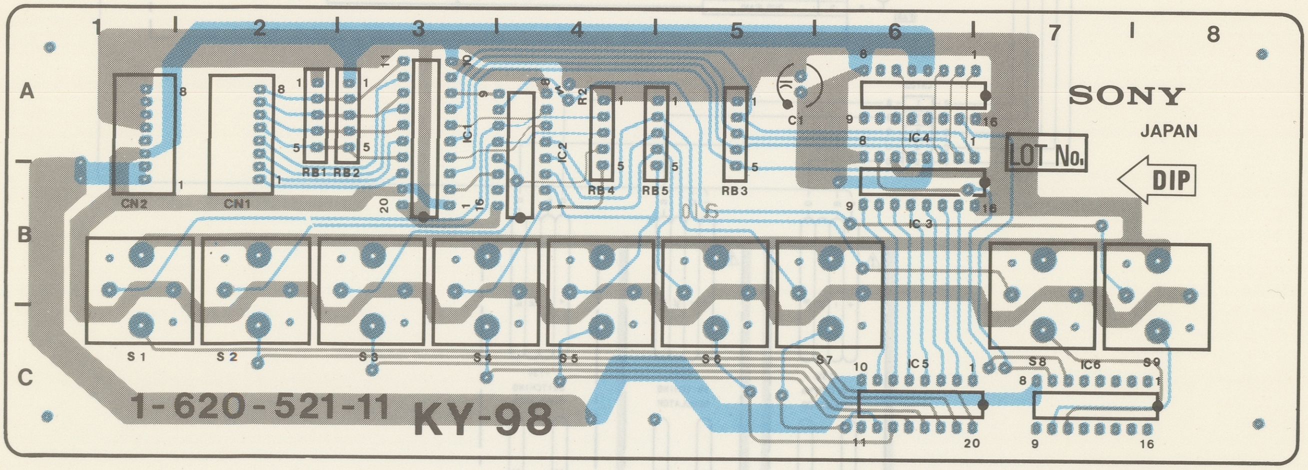
POWER ASSY FRAME
RE-26 BOARD


KY-99
REG (+10) IN
POWER SENSE OUT
GND (+10V)
GND (-10V)
REG (-10V) IN
REG (+5V) IN
REG (+13V) IN
REG (-13V) IN
REG (-5V) IN
GND
D-GND
D-GND
D-GND
A-GND
A-GND
RE-26
CN7
REG (+10V) OUT
POWER SENSE IN
GND (+10V)
CN8
GND (-10V)
REG (-10V) OUT
TP2
TP3
TP4
IC2 AD580M
IC1 NJM4558
IC101 LT350
IC102 LT1033
OUT CONT IN
GND OUT IN
C3 47 10V
R2 7500
RV1 500
R3 2400
C8 0.1
R1 330
C2 1.5 35V
C1 47 10V
D1 10EZ
D2 10EZ
C5 47 10V
R4 750
RV2 100
R5 100
C4 10 16V
CN2
REG (+13V) IN
REG (-13V) IN
CN3
REG (+5V) OUT
REG (+13V) OUT
REG (-13V) OUT
CN5
GND (-5V)
REG (-5V) OUT
CP1
DC-DC CONV
C7 6800 10V
C9 6800 10V
CN1
REG (+5V) IN
GND (+5V)
CN4
FAN (+13V) OUT
GND (FAN)
M101
FAN
R6 3.9
C6 1000 16V
CN105
+13V SWITCHING REGULATOR
+5V SWITCHING REGULATOR
-13V SWITCHING REGULATOR
+
-
NC
FG
AC
S102 VOLTAGE SELECTOR
100/110V
220/240V
CB101
T101
CN44
CN45
S101 POWER
CN46
F101
CN101 ~AC IN
ON
OFF

POWER ASSY FRAME
RE-26 BOARD
HDS-1000 (W W)

KY-98 BOARD

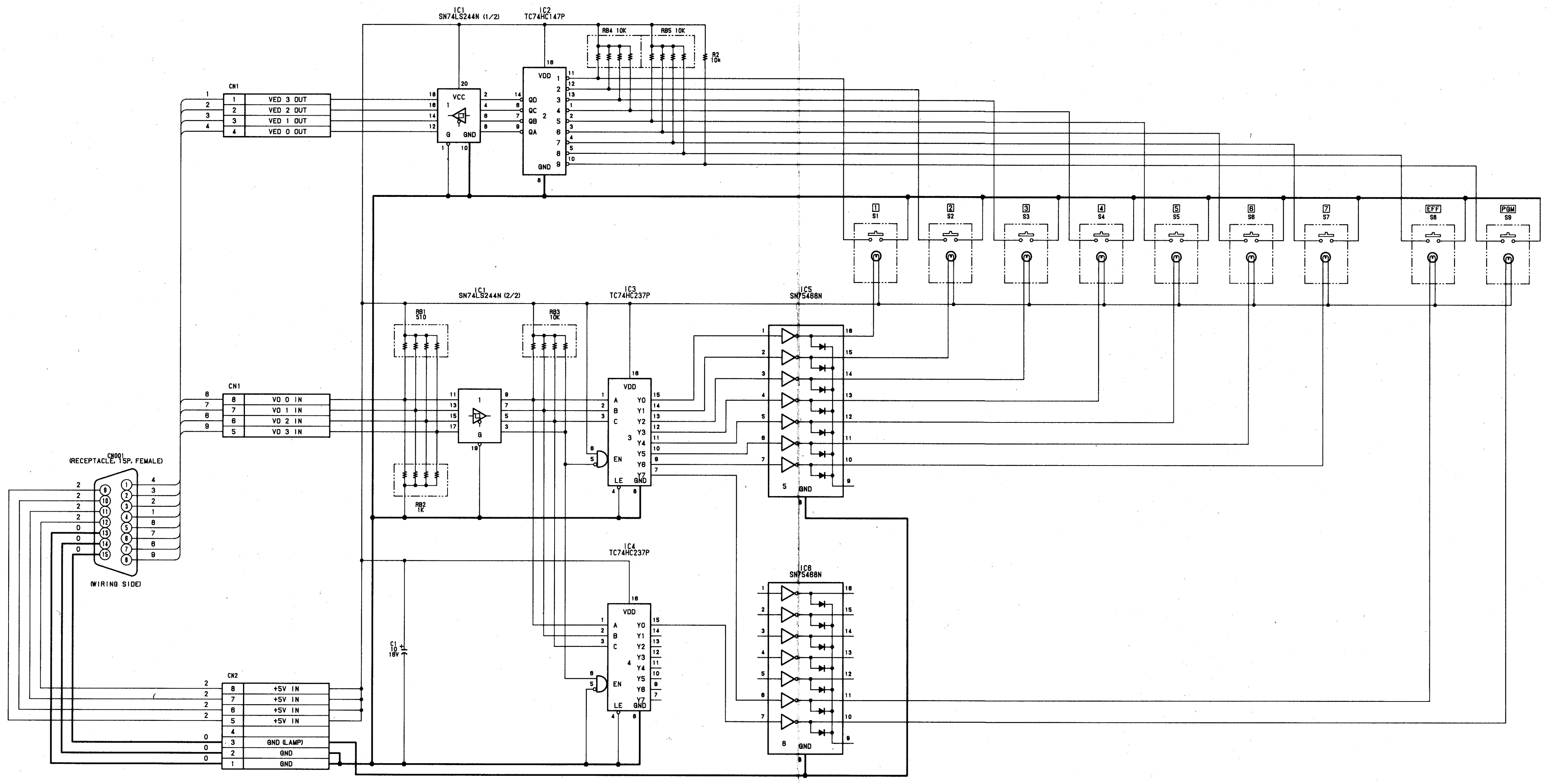
Component side


1
2
3
4
5
6
7
8
A
B
C
CN2
CN1
RB1
RB2
IC1
IC2
R2
RB4
RB5
RB3
C1
IC4
IC3
SONY
JAPAN
LOT No.
DIP
S1
S2
S3
S4
S5
S6
S7
S8
S9
IC5
IC6
1-620-521-11
KY-98

1-620-521-11 COMPONENT SIDE

KY-98 BOARD

REMOTE-VIDEO SELECTOR


IC1
SN74LS244N (1/2)
IC2
TC74HC147P
RB4 10K
RB5 10K
R2
10k
CN1
VED 3 OUT
VED 2 OUT
VED 1 OUT
VED 0 OUT
VCC
G
GND
VDD
QD
QC
QB
QA
GND
1
S1
2
S2
3
S3
4
S4
5
S5
6
S6
7
S7
EFF
S8
PGM
S9
IC1
SN74LS244N (2/2)
IC3
TC74HC237P
IC5
SN75468N
RB1
510
RB3
10K
RB2
1K
CN1
VO 0 IN
VO 1 IN
VO 2 IN
VO 3 IN
CN001
(RECEPTACLE, 15P, FEMALE)
(WIRING SIDE)
A
B
C
EN
LE
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
GND
IC4
TC74HC237P
IC6
SN75468N
C1
10
16V
CN2
+5V IN
+5V IN
+5V IN
+5V IN
GND (LAMP)
GND
GND

KY-98 BOARD
HDS-1000 (W W)

SECTION D
SPARE PARTS

D-1. PARTS INFORMATION

1. **Safety Related Component Warning**

   Components identified by shading marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replacement Parts supplied from Sony Parts Center will sometimes have different shape and outside view from the parts which actually in use. This is due to "**accommodating the improved parts and/or engineering changes**" or "**standardization of genuine parts.**"

   - This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

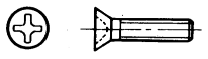
4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. **Abbreviation**

REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
BT	BATTERY	EL	FILTER	RV	VARIABLE RESISTOR
C	CAPACITOR	IC	IC	RY	RELAY
CN	CONNECTOR	L	INDUCTOR	S	SWITCH
CV	VARIABLE CAPACITOR	M	FAN	T	TRANSFORMER
D	DIODE	Q	TRANSISTOR	X	OSCILLATOR
DL	DELAY LINE	R	RESISTOR		
FB	FERRITE BEADRING	RB	RESISTER BLOCK		

All capacitors are in micro farads unless otherwise specified.
All inductors are in micro henries unless otherwise specified.
All resistors are in ohms.

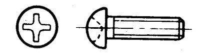
PRECISION +K
Cr-N



7-627-□□□-□□

SIZE	Parts No.
1.7 x 1.8	—
x 2	—
x 2.2	—
x 2.5	—
x 2.8	—
x 3	—
x 3.5	—
x 4	—
x 4.5	—
x 5	—
x 5.5	—
x 6	—
2 x 2	452-07
x 2.2	452-87
x 2.5	—
x 2.8	—
x 3	452-17
x 3.5	—
x 4	452-27
x 4.5	—
x 5	—
x 5.5	—
x 6	—
x 7	452-67
x 8	—
2.6 x 3.5	—
x 4	454-17
x 4.5	—
x 5	454-37
x 5.5	—
x 6	—
x 7	—
x 8	—

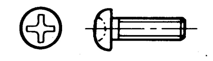
+P
Ni-N



7-621-□□□-□□

SIZE	Parts No.
2 x 3	255-12
x 4	255-22
x 5	255-32
x 6	255-42
x 8	255-52
x 10	255-62
x 12	255-72
x 14	—
x 16	—
x 20	—
2.3 x 5	—
x 6	—
x 8	—
x 10	—
x 12	—
x 14	—
x 16	—
x 20	—
2.6 x 3	259-12
x 4	259-22
x 5	259-32
x 6	259-42
x 8	259-52
x 10	259-62
x 12	259-72
x 14	259-82
x 16	260-02
x 20	260-22

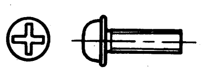
+B
Bzn-N



7-682-□□□-□□

SIZE	Parts No.
3 x 3	544-09
x 4	545-09
x 5	546-09
x 6	547-09
x 8	548-09
x 10	549-09
x 12	550-09
x 14	551-09
x 16	552-09
x 20	553-09
x 30	555-09
4 x 4	558-09
x 5	559-09
x 6	560-09
x 8	561-09
x 10	562-09
x 12	563-09
x 14	564-09
x 16	565-09
x 20	566-09

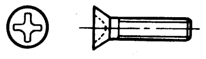
+PWH



7-682-□□□-□□

SIZE	Parts No.
2.6 x 4	
x 5	902-11
x 6	902-21
x 8	902-31
x 10	
x 12	902-51
x 14	
3 x 5	903-01
x 6	903-11
x 8	903-21
x 10	903-31
x 12	903-41
x 14	
4 x 6	904-01
x 8	904-11
x 10	904-21
x 12	904-31
x 14	904-41
x 16	
x 20	

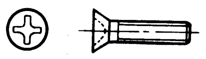
+K
Bzn-N



7-621-□□□-□□

SIZE	Parts No.
2 x 3	555-10
x 4	591-00
x 5	555-30
x 6	555-40
x 8	555-50
x 10	555-60
x 12	555-70
x 14	—
x 16	—
x 20	—
2.6 x 4	559-20
x 5	559-30
x 6	592-00
x 8	592-10
x 10	592-20
x 12	592-30
x 14	559-00
x 16	560-00
x 20	560-20

+K
Bzn-N



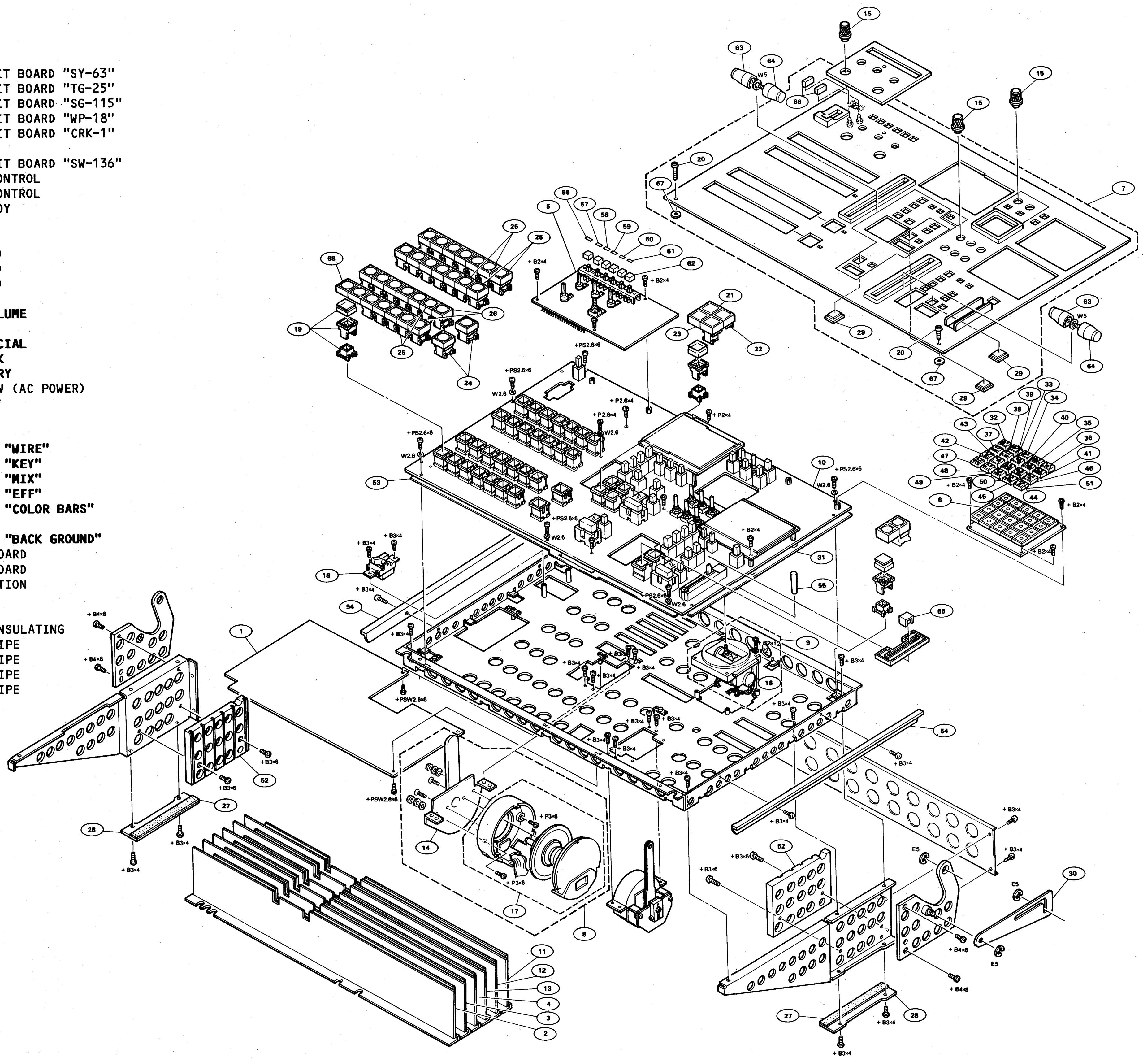
7-682-□□□-□□

SIZE	Parts No.
3 x 4	245-09
x 5	246-09
x 6	247-09
x 8	248-09
x 10	249-09
x 12	250-09
x 14	251-09
x 16	252-09
x 20	253-09
4 x 6	260-09
x 8	261-09
x 10	262-09
x 12	263-09
x 14	264-09
x 16	265-09
x 20	266-09

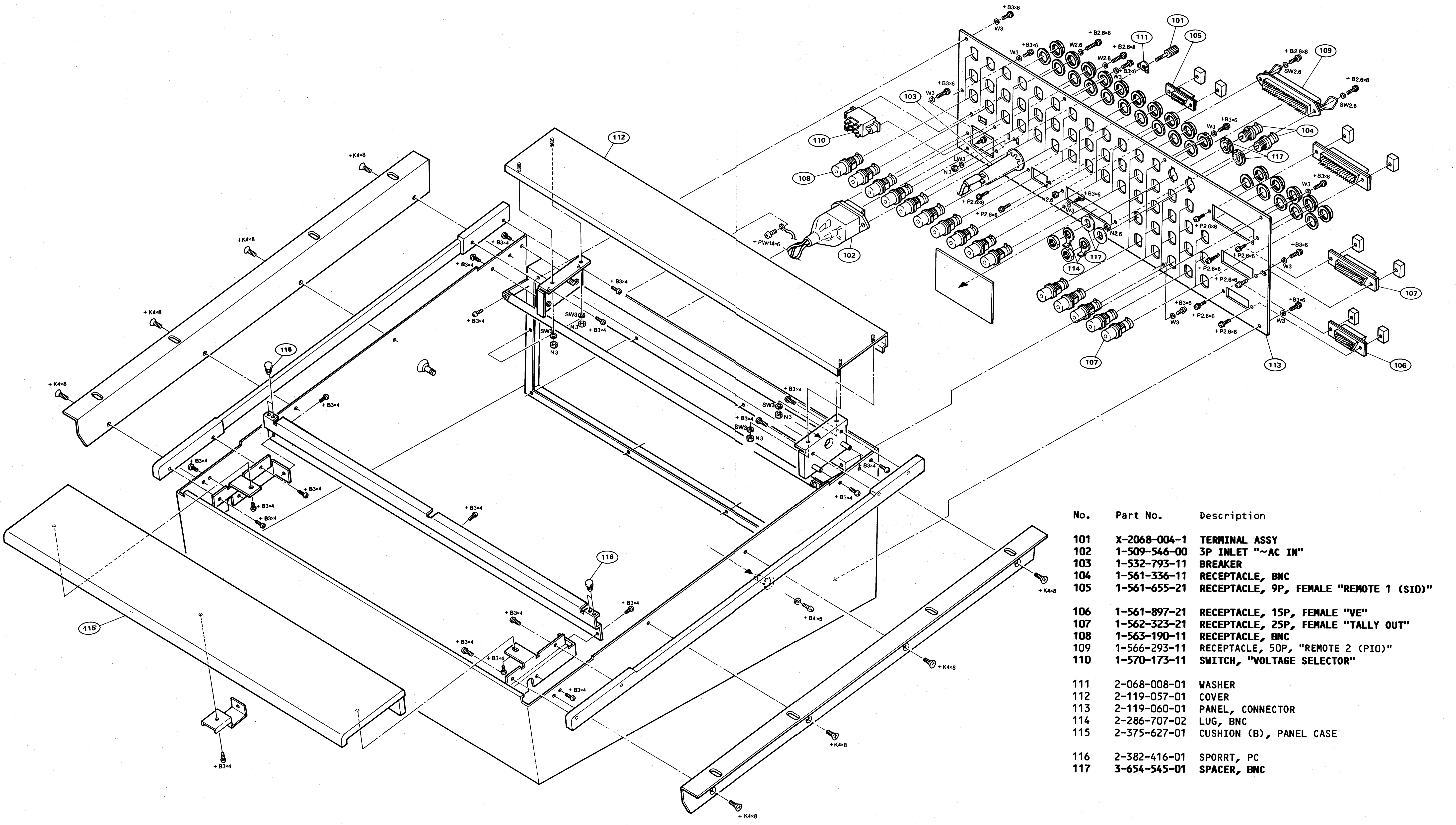
D-2. EXPLODED VIEW

CONTROL PANEL ASSY

No.	Part No.	Description
1	A-7513-468-A	MOUNTED CIRCUIT BOARD "SY-63"
2	A-7513-469-A	MOUNTED CIRCUIT BOARD "TG-25"
3	A-7513-471-A	MOUNTED CIRCUIT BOARD "SG-115"
4	A-7513-473-A	MOUNTED CIRCUIT BOARD "WP-18"
5	A-7513-477-A	MOUNTED CIRCUIT BOARD "CRK-1"
6	A-7513-479-A	MOUNTED CIRCUIT BOARD "SW-136"
7	A-7605-064-A	PANEL ASSY, CONTROL
8	A-7612-290-A	FADER ASSY, CONTROL
9	A-7612-291-A	STICK ASSY, JOY
10	A-7615-189-A	KY-99 ASSY
11	A-7615-191-A	EF-16 ASSY (R)
12	A-7615-192-A	EF-16 ASSY (G)
13	A-7615-193-A	EF-16 ASSY (B)
14	X-2119-001-1	BRACKET ASSY
15	**X-2119-002-1**	**KNOB ASSY, VOLUME**
16	**1-237-495-11**	**RES, VAR, SPECIAL (JOY STICK) 5K**
17	**1-464-742-11**	**ENCODER, ROTARY**
18	1-570-117-11	SWITCH, SEESAW (AC POWER)
19	1-570-516-91	SWITCH, PUSH
20	2-112-879-01	SCREW, COIN
21	**2-119-002-01**	**PANEL, SWITCH "WIRE"**
22	**2-119-002-11**	**PANEL, SWITCH "KEY"**
23	**2-119-022-21**	**PANEL, SWITCH "MIX"**
24	**2-119-002-31**	**PLATE, SWITCH "EFF"**
25	**2-119-002-51**	**PLATE, SWITCH "COLOR BARS"**
26	**2-119-002-61**	**PLATE, SWITCH "BACK GROUND"**
27	2-119-003-01	CUSHION, PC BOARD
28	2-119-006-01	STOPPER, PC BOARD
29	2-119-007-01	PANEL, INDICATION
30	2-119-014-01	STAY
31	2-119-025-01	SPACER (B), INSULATING
32	2-119-039-02	KEYTOP (1), WIPE
33	2-119-039-12	KEYTOP (1), WIPE
34	2-119-039-22	KEYTOP (1), WIPE
35	2-119-039-32	KEYTOP (1), WIPE
36	2-119-039-42	KEYTOP (1), WIPE
37	2-119-039-52	KEYTOP (1), WIPE
38	2-119-039-62	KEYTOP (1), WIPE
39	2-119-039-72	KEYTOP (1), WIPE
40	2-119-039-82	KEYTOP (1), WIPE
41	2-119-039-92	KEYTOP (1), WIPE
42	2-119-040-02	KEYTOP (1), WIPE
43	2-119-040-12	KEYTOP (1), WIPE
44	2-119-040-22	KEYTOP (1), WIPE
45	2-119-040-32	KEYTOP (1), WIPE
46	2-119-040-42	KEYTOP (1), WIPE
47	2-119-040-52	KEYTOP (1), WIPE
48	2-119-040-62	KEYTOP (1), WIPE
49	2-119-040-72	KEYTOP (1), WIPE
50	2-119-040-82	KEYTOP (1), WIPE
51	2-119-040-92	KEYTOP (1), WIPE
52	2-119-042-01	RAIL
53	2-119-050-01	SPACER (A), INSULATING
54	2-119-056-01	ANGLE, FITTING
55	2-119-072-01	KNOB, JOYSTCK
56	2-119-075-01	SHEET, COLOR (MAGENTA)
57	2-119-075-11	SHEET, COLOR (RED)
58	2-119-075-21	SHEET, COLOR (YELLOW)
59	2-119-075-31	SHEET, COLOR (GREEN)
60	2-119-075-41	SHEET, COLOR (CYAN)
61	2-119-075-51	SHEET, COLOR (BLUE)
62	2-119-076-01	KEY, TOP
63	**2-389-719-11**	**KNOB (A), LEVER**
64	**2-389-720-11**	**KNOB (B), LEVER**
65	2-389-734-01	KNOB, SLIDE VR
66	2-295-991-00	GUARD, SWITCH
67	3-650-537-00	WASHER
68	**3-707-232-01**	**COVER, TRANSPARENT**

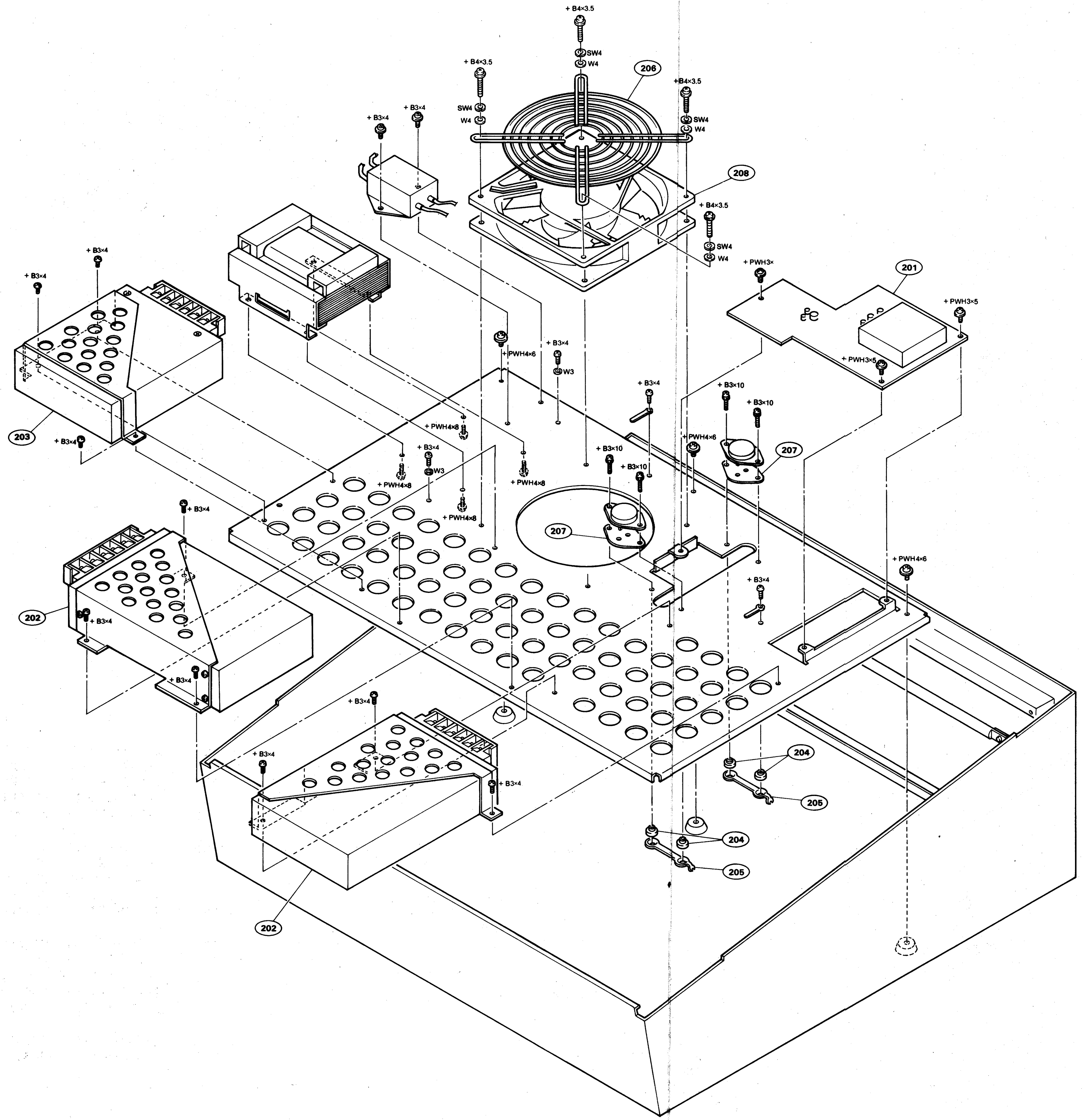


REAR PANEL ASSY


101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
+B3×6
W3
+B2.6×8
W2.6
SW2.6
LW3
N3
N2.6
+P2.6×6
+PWH4×6
+K4×8
+B3×4
SW3
+B4×5

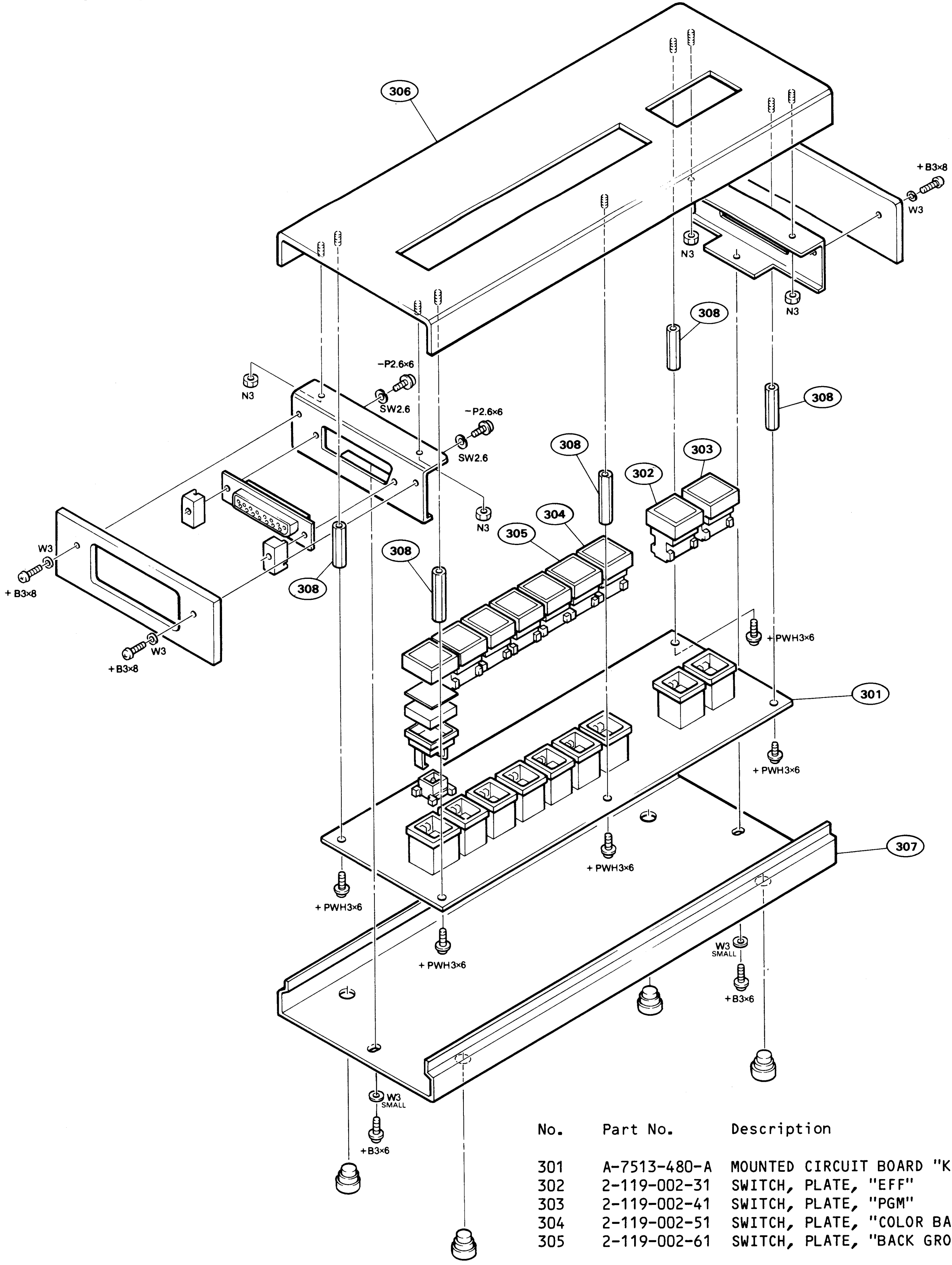
No.	Part No.	Description
101	**X-2068-004-1**	**TERMINAL ASSY**
102	**1-509-546-00**	**3P INLET "~AC IN"**
103	**1-532-793-11**	**BREAKER**
104	**1-561-336-11**	**RECEPTACLE, BNC**
105	**1-561-655-21**	**RECEPTACLE, 9P, FEMALE "REMOTE 1 (SIO)"**
106	**1-561-897-21**	**RECEPTACLE, 15P, FEMALE "VE"**
107	**1-562-323-21**	**RECEPTACLE, 25P, FEMALE "TALLY OUT"**
108	**1-563-190-11**	**RECEPTACLE, BNC**
109	1-566-293-11	RECEPTACLE, 50P, "REMOTE 2 (PIO)"
110	**1-570-173-11**	**SWITCH, "VOLTAGE SELECTOR"**
111	2-068-008-01	WASHER
112	2-119-057-01	COVER
113	2-119-060-01	PANEL, CONNECTOR
114	2-286-707-02	LUG, BNC
115	2-375-627-01	CUSHION (B), PANEL CASE
116	2-382-416-01	SPORRT, PC
117	**3-654-545-01**	**SPACER, BNC**

CHASSIS ASSY


+ B4×3.5
SW4
W4
206
+ B4×3.5
SW4
W4
+B4×3.5
SW4
W4
208
+ B4×3.5
SW4
W4
+ B3×4
+ B3×4
+ B3×4
+ B3×4
203
+ B3×4
+ PWH4×6
+ B3×4
W3
+ PWH3×
201
+ PWH3×5
+ PWH3×5
+ B3×4
+ B3×10
+ B3×10
+ PWH4×8
+ B3×4
W3
+ PWH4×8
+ PWH4×8
+ PWH4×8
+ B3×10
+ B3×10
+ PWH4×6
207
207
+ B3×4
202
+ B3×4
+ B3×4
+ PWH4×6
+ B3×4
+ B3×4
+ B3×4
+ B3×4
204
205
204
205
202

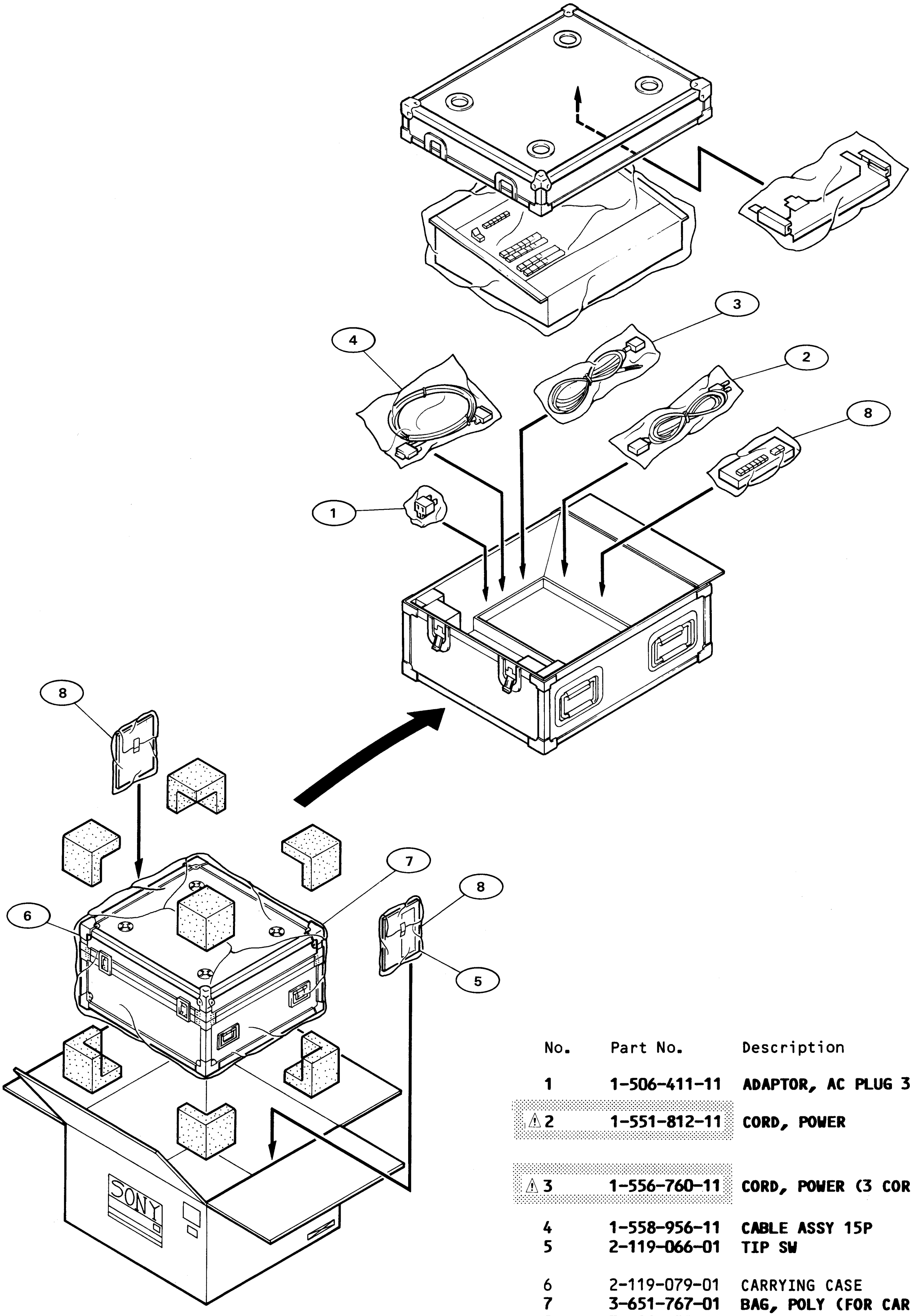
No.	Part No.	Description
201	A-7513-475-A	MOUNTED CIRCUIT BOARD "RE-26"
202	**1-413-271-11**	**REGULATOR, SWITCHING (ES-10-12)**
203	**1-413-272-11**	**REGULATOR, SWITCHING (ES-9-5)**
204	**2-832-003-00**	**BUSH, INSULATING**
205	**3-646-806-00**	**NUT, (A)**
206	3-691-481-01	GUARD, FINGER
207	4-848-640-11	PLATE, INSULATING, TO-3
208	**8-838-100-01**	**MOTOR, DC (BHR-3200A)**

VE REMOTE CONTROL


306
+B3×8
W3
N3
N3
308
308
−P2.6×6
SW2.6
N3
−P2.6×6
SW2.6
308
303
302
N3
W3
+B3×8
304
305
308
308
W3
+B3×8
+PWH3×6
301
+PWH3×6
307
+PWH3×6
+PWH3×6
+PWH3×6
W3 SMALL
+B3×6
W3 SMALL
+B3×6

No.	Part No.	Description
301	A-7513-480-A	MOUNTED CIRCUIT BOARD "KY-98"
302	2-119-002-31	SWITCH, PLATE, "EFF"
303	2-119-002-41	SWITCH, PLATE, "PGM"
304	2-119-002-51	SWITCH, PLATE, "COLOR BARS"
305	2-119-002-61	SWITCH, PLATE, "BACK GROUND"
306	2-119-052-01	PLATE, FRONT
307	2-119-053-01	COVER, BOTTOM
308	2-280-622-51	SUPPORT (M3), HEXAGON

D-3. PACKING MATERIAL AND ACCESSORY



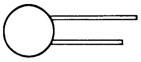
No.	Part No.	Description
1	1-506-411-11	ADAPTOR, AC PLUG 3P-2P
⚠2	1-551-812-11	CORD, POWER
⚠3	1-556-760-11	CORD, POWER (3 CORE)
4	1-558-956-11	CABLE ASSY 15P
5	2-119-066-01	TIP SW
6	2-119-079-01	CARRYING CASE
7	3-651-767-01	BAG, POLY (FOR CARRYING CASE)
8	3-701-630-01	BAG, POLY (FOR MANUAL)

D-4. ELECTRICAL PARTS LIST

CAPACITOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CERAMIC CAPACITOR **0.5 pF through 820 pF**
50WV



Value	Parts No.
0.5 pF	1-101-837-00
1	1-102-934-00
1.5	1-101-576-00
2	1-102-935-00
3	1-102-936-00
4	1-102-937-00
5	1-102-942-00
6	1-102-943-00
7	1-102-944-00
8	1-102-945-00
9	1-102-946-00
10	1-102-947-00
11	1-102-948-00
12	1-102-949-00
13	1-102-950-00
15	1-102-951-00
16	1-102-952-00
18	1-102-953-00
20	1-102-958-00
22	1-102-959-00

Value	Parts No.
24 pF	1-102-960-00
27	1-102-961-00
30	1-102-962-00
33	1-102-963-00
36	1-102-964-00
39	1-102-965-00
43	1-102-966-00
47	1-101-880-00
51	1-101-882-00
56	1-101-884-00
62	1-101-886-00
68	1-101-888-00
75	1-101-890-00
82	1-102-971-00
91	1-102-972-00
100	1-102-973-00
110	1-102-815-00
120	1-102-816-00
130	1-101-081-00
150	1-101-361-00

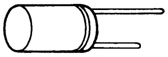
Value	Parts No.
160 pF	1-101-367-00
180	1-102-976-00
200	1-102-977-00
220	1-102-978-00
240	1-102-979-00
270	1-102-980-00
300	1-102-981-00
330	1-102-820-00
360	1-102-821-00
390	1-102-822-00
430	1-102-823-00
470	1-102-824-00
510	1-101-059-00
560	1-102-115-00
680	1-102-116-00
820	1-102-117-00

CAPACITOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

ELECTROLYTIC CAPACITOR

0.1μF through 100μF ±20%
4WV through 50WV



Parts No. 1-124-□□□-00

Value		Part No. —□□□—
0.1μF	50V	249
0.15	50	250
0.22	50	251
0.33	50	252
0.47	50	253
0.68	50	254
1	50	255
1.5	50	256
2.2	35	
	50	257
3.3	25	
	35	
	50	258
4.7	16	245

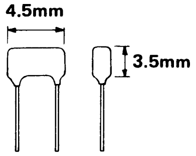
Value		Part No. —□□□—
4.7μF	25V	
	35	245
	50	259
6.8	10	
	16	
	25	239
	35	246
	50	260
10	6.3	
	10	
	16	233
	25	240
	35	247
	50	261

Value		Part No. —□□□—
22μF	6.3V	222
	10	
	16	234
	25	
	35	248
33	4	220
	6.3	
	10	229
	16	
	25	242
47	6.3	224
	10	
	16	236
100	6.3	225

RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

METAL FILM RESISTOR



± 1%, 1/8W

Parts No. 1-214-□□□-00 (10Ω through 33kΩ)
Parts No. 1-215-□□□-11 (36kΩ through 100kΩ)

Value	Parts No. —□□□—
10Ω	509
11	510
12	511
13	512
15	513
16	514
18	515
20	516
22	517
24	518
27	519
30	520
33	521
36	522
39	523
43	524
47	525
51	526
56	527
62	528
68	529
75	530
82	531
91	532

Value	Parts No. —□□□—
100Ω	533
110	534
120	535
130	536
150	537
160	538
180	539
200	540
220	541
240	542
270	543
300	544
330	545
360	546
390	547
430	548
470	549
510	550
560	551
620	552
680	553
750	554
820	555
910	556

Value	Parts No. —□□□—
1.0kΩ	557
1.1	558
1.2	559
1.3	560
1.5	561
1.6	562
1.8	563
2.0	564
2.2	565
2.4	566
2.7	567
3.0	568
3.3	569
3.6	570
3.9	571
4.3	572
4.7	573
5.1	574
5.6	575
6.2	576
6.8	577
7.5	578
8.2	579
9.1	580

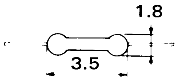
Value	Parts No. —□□□—
10kΩ	581
11	582
12	583
13	584
15	585
16	586
18	587
20	588
22	589
24	590
27	591
30	592
33	593
36kΩ	819
39	820
43	821
47	822
51	823
56	824
62	825
68	826
75	827
82	828
91	829
100	830

RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CARBON RESISTOR (1/6W)

±5%, 1/6W, non-special type
2.2Ω through 1MΩ



Parts No. 1-247-□□□-00

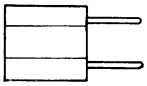
Value	Parts No. –□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–
1Ω	–	36Ω	796	1.2kΩ	833	43kΩ	870
1.1	–	39	797	1.3	834	47	871
1.2	–	43	798	1.5	835	51	872
1.3	–	47	799	1.6	836	56	873
1.5	–	51	800	1.8	837	62	874
1.6	–	56	801	2	838	68	875
1.8	–	62	802	2.2	839	75	876
2	–	68	803	2.4	840	82	877
2.2	767	75	804	2.7	841	91	878
2.4	768	82	805	3	842	100kΩ	879
2.7	769	91	806	3.3	843	110	880
3	770	100Ω	807	3.6	844	120	881
3.3	771	110	808	3.9	845	130	882
3.6	772	120	809	4.3	846	150	883
3.9	773	130	810	4.7	847	160	884
4.3	774	150	811	5.1	848	180	885
4.7	775	160	812	5.6	849	200	886
5.1	776	180	813	6.2	850	220	887
5.6	777	200	814	6.8	851	240	888
6.2	778	220	815	7.5	852	270	889
6.8	779	240	816	8.2	853	300	890
7.5	780	270	817	9.1	854	330	891
8.2	781	300	818	10kΩ	855	360	892
9.1	782	330	819	11	856	390	893
10Ω	783	360	820	12	857	430	894
11	784	390	821	13	858	470	895
12	785	430	822	15	859	510	896
13	786	470	823	16	860	560	897
15	787	510	824	18	861	620	898
16	788	560	825	20	862	680	899
18	789	620	826	22	863	750	900
20	790	680	827	24	864	820	901
22	791	750	828	27	865	910	902
24	792	820	829	30	866	1MΩ	903
27	793	910	830	33	867		
30	794	1kΩ	831	36	868		
33	795	1.1	832	39	869		

INDUCTOR

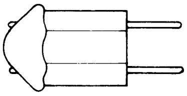
Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

MICRO INDUCTOR 1 μH through 470 μH
±5%

-21



-00



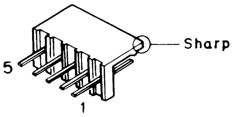
Parts No. 1-408-□□□-□□

Value	Parts No. —□□□—	Value	Parts No. —□□□—	Value	Parts No. —□□□—	Value	Parts No. —□□□—
1 μH	397	4.7 μH	405	22 μH	413	100 μH	421
1.2	398	5.6	406	27	414	120	422
1.5	399	6.8	407	33	415	150	423
1.8	400	8.2	408	39	416	180	424
2.2	401	10	409	47	417	220	425
2.7	402	12	410	56	418	270	426
3.3	403	15	411	68	419	330	427
3.9	404	18	412	82	420	390	428
						470	429

CONNECTOR

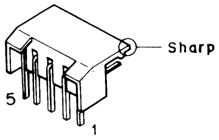
Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

top-type receptacle



2P	1-560-356-00
3P	1-560-357-00
4P	1-560-358-00
5P	1-560-359-00
6P	1-560-360-00
8P	1-560-361-00
10P	1-560-362-00
12P	1-560-363-00

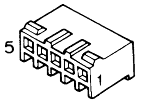
side-type receptacle



2P	1-560-364-00
3P	1-560-365-00
4P	1-560-366-00
5P	1-560-367-00
6P	1-560-368-00
8P	1-560-369-00
10P	1-560-370-00
12P	1-560-371-00

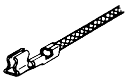
plug

housing



2P	1-561-514-00
3P	1-561-515-00
4P	1-561-516-00
5P	1-561-517-00
6P	1-561-518-00
8P	1-561-519-00
10P	1-561-520-00
12P	1-561-521-00

contact



1-560-372-00

CN-140 BOARD

Ref.No.	Part No.	Description
	1-620-518-11	PRINTED CIRCUIT BOARD "CN-140"
CN4	1-566-291-11	RECEPTACLE, 40P MALE
CN5	1-566-290-11	RECEPTACLE, 10P MALE

CN-141 BOARD

Ref.No.	Part No.	Description
	1-620-519-11	PRINTED CIRCUIT BOARD "CN-141"
CN3	1-566-291-11	RECEPTACLE, 40P MALE
CN4	1-566-291-11	RECEPTACLE, 40P MALE

CN-176 BOARD

Ref.No.	Part No.	Description
	1-620-520-11	PRINTED CIRCUIT BOARD "CN-176"
	1-561-365-21	**CONNECTOR**

Ref.No.	Part No.	Description
CRK-1 BOARD		
	A-7513-477-A	MOUNTED CIRCUIT BOARD "CRK-1"
	1-560-880-11	PLUG 20P, HOUSING 20P
	1-560-880-11	PLUG 20P, HOUSING 20P
C1	1-161-894-00	CERAMIC 0.1 50V
C2	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-101-888-00	CERAMIC 68PF 5% 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C46	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894 00	CERAMIC 0.1 50V
C65	1-161-894-00	CERAMIC 0.1 50V
C66	1-161-894-00	CERAMIC 0.1 50V
C67	1-161-894-00	CERAMIC 0.1 50V
C68	1-161-894-00	CERAMIC 0.1 50V
C69	1-161-894-00	CERAMIC 0.1 50V
C71	1-161-894-00	CERAMIC 0.1 50V
C72	1-161-894-00	CERAMIC 0.1 50V
C73	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C76	1-161-894-00	CERAMIC 0.1 50V
C80	1-161-894-00	CERAMIC 0.1 50V
C81	1-161-894-00	CERAMIC 0.1 50V
C82	1-161-894-00	CERAMIC 0.1 50V
C83	1-161-894-00	CERAMIC 0.1 50V
C91	1-161-894-00	CERAMIC 0.1 50V
C92	1-161-894-00	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V
D1	8-719-911-19	1SS119
D2	8-719-911-19	1SS119
D3	8-719-911-19	1SS119
D4	8-719-911-19	1SS119
D5	8-719-911-19	1SS119
D6	8-719-812-31	TLR123
D7	8-719-911-19	1SS119
D8	8-719-911-19	1SS119
D9	8-719-911-19	1SS119
D10	8-719-100-21	RD3.9E-B2
D11	8-719-100-21	RD3.9E-B2
IC1	8-759-700-08	NJM4558S: JRC
IC2	8-759-700-08	NJM4558S: JRC
IC3	8-759-015-95	MC1595L: MOTOROLA
IC4	8-759-015-95	MC1595L: MOTOROLA
IC5	8-759-015-95	MC1595L: MOTOROLA
IC6	8-759-917-43	TC74HC138N: TOSHIBA
IC7	8-759-917-43	TC74HC138N: TOSHIBA
IC8	8-759-203-01	TC74HC175P: TOSHIBA
IC9	8-759-112-13	uPC1663: NEC
Q1	8-729-110-53	2SA1005
Q2	8-729-110-53	2SA1005
Q3	8-729-110-53	2SA1005
Q4	8-729-110-53	2SA1005
Q5	8-729-266-83	2SC2668
Q6	8-729-266-83	2SC2668
Q7	8-729-266-83	2SC2668
Q8	8-729-103-19	2SA1206-K1
Q9	8-729-103-19	2SA1206-K1
Q10	8-729-103-19	2SA1206-K1
Q11	8-729-103-19	2SA1206-K1
Q12	8-729-103-19	2SA1206-K1
Q13	8-729-103-19	2SA1206-K1
Q14	8-729-103-19	2SA1206-K1
Q15	8-729-103-19	2SA1206-K1
Q19	8-729-266-83	2SC2668
Q20	8-729-103-19	2SA1206-K1
Q21	8-729-103-19	2SA1206-K1
Q22	8-729-266-83	2SC2668
Q23	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q24	8-729-266-83	2SC2668
Q30	8-729-117-54	2SA1175
Q31	8-729-103-19	2SA1206-K1
Q32	8-729-103-19	2SA1206-K1
Q33	8-729-266-83	2SC2668
Q34	8-729-110-53	2SA1005
Q35	8-729-110-53	2SA1005
Q36	8-729-266-83	2SC2668
Q40	8-729-117-54	2SA1175
Q41	8-729-103-19	2SA1206-K1
Q42	8-729-103-19	2SA1206-K1
Q43	8-729-266-83	2SC2668
Q44	8-729-110-53	2SA1005
Q45	8-729-110-53	2SA1005
Q46	8-729-266-83	2SC2668
Q50	8-729-117-54	2SA1175
Q51	8-729-103-19	2SA1206-K1
Q52	8-729-103-19	2SA1206-K1
Q53	8-729-266-83	2SC2668
Q54	8-729-110-53	2SA1005
Q55	8-729-110-53	2SA1005
Q56	8-729-266-83	2SC2668
Q60	8-729-117-54	2SA1175
Q62	8-729-266-83	2SC2668
Q63	8-729-103-19	2SA1206-K1
Q64	8-729-103-19	2SA1206-K1
Q65	8-729-103-19	2SA1206-K1
Q66	8-729-117-54	2SA1175
R15	1-215-957-11	METAL FOIL 1.000K
R16	1-215-956-11	METAL FOIL 709.2
R17	1-215-964-11	METAL FOIL 7.241K
R18	1-215-957-11	METAL FOIL 1.000K
R19	1-215-958-11	METAL FOIL 1.590K
R20	1-215-962-11	METAL FOIL 2.636K
R21	1-215-955-11	METAL FOIL 603.0
R22	1-215-960-11	METAL FOIL 2.089K
R23	1-215-957-11	METAL FOIL 1.000K
R80	1-216-752-11	METAL FOIL 1.667K
R81	1-216-749-11	METAL FOIL 847.5
R82	1-216-754-11	METAL FOIL 4.545K
R111	1-216-751-11	METAL FOIL 1.340K
R112	1-216-753-11	METAL FOIL 3.937K
R140	1-215-957-11	METAL FOIL 1.000K

Ref.No.	Part No.	Description
R141	1-216-750-11	METAL FOIL 1.079K
R142	1-216-755-11	METAL FOIL 13.67K
RV1	1-237-528-11	METAL 1K/1K
RV3	1-237-493-11	METAL 5K
RV4	1-228-456-00	METAL 1K
RV5	1-228-456-00	METAL 1K
RV6	1-228-456-00	METAL 1K
RV7	1-228-458-00	METAL 5K
RV8	1-237-493-11	METAL 5K
RV9	1-237-493-11	METAL 5K
RV10	1-237-493-11	METAL 5K
RV11	1-228-454-00	METAL 200
RV12	1-228-454-00	METAL 200
S1	1-570-918-11	PUSH (6 KEY)

Ref.No.	Part No.	Description

EF-16 BOARD

Ref.No.	Part No.	Description
	A-7615-191-A	EF-16 ASSY
C2	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C15	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C43	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-891-11	CERAMIC 0.033 50V
C79	1-131-368-00	TANTALUM 3.3 10% 16V
C82	1-161-894-00	CERAMIC 0.1 50V
C84	1-161-894-00	CERAMIC 0.1 50V
C91	1-161-485-00	CERAMIC 0.1 50V
C95	1-161-894-00	CERAMIC 0.1 50V
C97	1-161-894-00	CERAMIC 0.1 50V
C100	1-161-891-11	CERAMIC 0.033 50V
C102	1-161-891-11	CERAMIC 0.033 50V
C111	1-161-894-00	CERAMIC 0.1 50V
C117	1-161-888-00	CERAMIC 0.01 50V
C125	1-131-368-00	TANTALUM 3.3 10% 16V
C129	1-161-894-00	CERAMIC 0.1 50V
C135	1-161-894-00	CERAMIC 0.1 50V
C136	1-161-891-11	CERAMIC 0.033 50V
C140	1-161-894-00	CERAMIC 0.1 50V
C201	1-161-485-00	CERAMIC 0.1 50V
CN1	1-563-721-11	RECEPTACLE, RF
CN2	1-563-721-11	RECEPTACLE, RF
CN3	1-563-721-11	RECEPTACLE, RF
CN4	1-563-721-11	RECEPTACLE, RF
CN5	1-563-721-11	RECEPTACLE, RF
CN6	1-563-721-11	RECEPTACLE, RF
CN7	1-563-721-11	RECEPTACLE, RF
CN8	1-563-721-11	RECEPTACLE, RF
CN9	1-563-721-11	RECEPTACLE, RF
CN10	1-563-721-11	RECEPTACLE, RF

Ref.No.	Part No.	Description
CN11	1-563-721-11	RECEPTACLE, RF
CN12	1-563-721-11	RECEPTACLE, RF
CN13	1-563-721-11	RECEPTACLE, RF
CN14	1-563-721-11	RECEPTACLE, RF
CN15	1-563-721-11	RECEPTACLE, RF
CV1	1-141-350-11	20PF
CV2	1-141-350-11	20PF
CV3	1-141-352-11	80PF
CV4	1-141-351-11	40PF
CV5	1-141-352-11	80PF
CV6	1-141-351-11	40PF
CV7	1-141-350-11	20PF
CV8	1-141-350-11	20PF
CV9	1-141-350-11	20PF
CV10	1-141-350-11	20PF
DL1	1-415-522-11	20nS
DL2	1-415-522-11	20nS
DL3	1-415-523-11	25nS
DL4	1-415-523-11	25nS
IC1	8-759-203-09	TC74HC237P: TOSHIBA
IC2	8-759-203-09	TC74HC237P: TOSHIBA
IC3	8-759-203-09	TC74HC237P: TOSHIBA
IC4	8-759-203-09	TC74HC237P: TOSHIBA
IC5	8-759-203-09	TC74HC237P: TOSHIBA
IC6	8-759-000-99	MC74HC74N: MOTOROLA
IC7	8-759-202-55	TC74HC244P: TOSHIBA
IC8	8-759-917-43	SN74HC138N: TI
IC9	8-759-917-43	SN74HC138N: TI
IC10	8-749-900-75	HDS01: SOSHIN
IC11	8-749-900-75	HDS01: SOSHIN
IC12	8-749-900-75	HDS01: SOSHIN
IC13	8-749-900-75	HDS01: SOSHIN
IC14	8-749-900-75	HDS01: SOSHIN
IC15	8-749-900-75	HDS01: SOSHIN
IC16	8-749-900-75	HDS01: SOSHIN
IC17	8-749-900-75	HDS01: SOSHIN
IC18	8-749-900-75	HDS01: SOSHIN
IC19	8-749-900-75	HDS01: SOSHIN
IC20	8-749-900-75	HDS01: SOSHIN

Ref.No.	Part No.	Description
IC21	8-749-900-75	HDS01: SOSHIN
IC22	8-749-900-75	HDS01: SOSHIN
IC23	8-749-900-75	HDS01: SOSHIN
IC24	8-749-900-75	HDS01: SOSHIN
IC25	8-749-900-75	HDS01: SOSHIN
IC26	8-749-900-75	HDS01: SOSHIN
IC27	8-749-900-75	HDS01: SOSHIN
IC28	8-749-900-75	HDS01: SOSHIN
IC29	8-749-900-75	HDS01: SOSHIN
IC30	8-749-900-75	HDS01: SOSHIN
IC31	8-749-900-75	HDS01: SOSHIN
IC32	8-749-900-75	HDS01: SOSHIN
IC33	8-749-900-75	HDS01: SOSHIN
IC34	8-749-900-75	HDS01: SOSHIN
IC35	8-749-900-75	HDS01: SOSHIN
IC36	8-749-900-75	HDS01: SOSHIN
IC37	8-749-900-75	HDS01: SOSHIN
IC38	8-749-900-75	HDS01: SOSHIN
IC39	8-749-900-75	HDS01: SOSHIN
IC40	8-749-900-75	HDS01: SOSHIN
IC41	8-749-900-75	HDS01: SOSHIN
IC42	8-749-900-75	HDS01: SOSHIN
IC43	8-749-900-75	HDS01: SOSHIN
IC44	8-749-900-75	HDS01: SOSHIN
IC45	8-759-000-99	MC74HC74N: MOTOROLA
IC46	8-749-900-75	HDS01: SOSHIN
IC47	8-749-900-75	HDS01: SOSHIN
IC48	8-749-900-75	HDS01: SOSHIN
IC49	8-749-900-75	HDS01: SOSHIN
IC50	8-759-930-80	CA3080E: RCA
IC51	8-759-930-80	CA3080E: RCA
IC52	8-749-900-75	HDS01: SOSHIN
IC53	8-749-900-75	HDS01: SOSHIN
IC54	8-749-900-75	HDS01: SOSHIN
IC55	8-749-900-75	HDS01: SOSHIN
IC56	8-759-202-74	TC74HC04P: TOSHIBA
IC57	8-759-000-99	MC74HC74N: MOTOROLA
IC58	8-759-939-87	CA3102E-S1: RCA
IC59	8-759-939-87	CA3102E-S1: RCA
IC60	8-759-930-80	CA3080E: RCA
IC61	8-759-930-80	CA3080E: RCA
IC62	8-749-900-75	HDS01: SOSHIN
IC63	8-749-900-75	HDS01: SOSHIN
IC64	8-749-900-75	HDS01: SOSHIN
IC65	8-749-900-75	HDS01: SOSHIN

Ref.No.	Part No.	Description
IC66	8-749-900-75	HDS01: SOSHIN
IC67	8-759-700-08	NJM4558S: JRC
IC68	8-759-930-80	CA3080E: RCA
IC69	8-759-930-80	CA3080E: RCA
IC70	8-749-900-75	HDS01: SOSHIN
IC71	8-759-939-87	CA3102E-S1: RCA
IC72	8-759-939-87	CA3102E-S1: RCA
IC73	8-759-930-80	CA3080E: RCA
IC74	8-759-930-80	CA3080E: RCA
Q1	8-729-103-19	2SA1206-K1
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-266-83	2SC2668
Q5	8-729-103-19	2SA1206-K1
Q6	8-729-266-83	2SC2668
Q7	8-729-103-19	2SA1206-K1
Q8	8-729-266-83	2SC2668
Q9	8-729-103-19	2SA1206-K1
Q10	8-729-266-83	2SC2668
Q11	8-729-103-19	2SA1206-K1
Q12	8-729-266-83	2SC2668
Q13	8-729-103-19	2SA1206-K1
Q14	8-729-266-83	2SC2668
Q15	8-729-266-83	2SC2668
Q16	8-729-266-83	2SC2668
Q17	8-729-266-83	2SC2668
Q18	8-729-103-19	2SA1206-K1
Q19	8-729-266-83	2SC2668
Q20	8-729-266-83	2SC2668
Q21	8-729-266-83	2SC2668
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-266-83	2SC2668
Q24	8-729-266-83	2SC2668
Q25	8-729-266-83	2SC2668
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
Q30	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q31	8-729-266-83	2SC2668
Q32	8-729-266-83	2SC2668
Q33	8-729-266-83	2SC2668
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668
Q36	8-729-103-19	2SA1206-K1
Q37	8-729-800-42	2SK152
Q38	8-729-103-19	2SA1206-K1
Q39	8-729-800-42	2SK152
Q40	8-729-103-19	2SA1206-K1
Q41	8-729-266-83	2SC2668
Q42	8-729-110-53	2SA1005
Q43	8-729-266-83	2SC2668
Q44	8-729-103-19	2SA1206-K1
Q45	8-729-110-53	2SA1005
Q46	8-729-800-42	2SK152
Q47	8-729-266-83	2SC2668
Q48	8-729-800-42	2SK152
Q49	8-729-266-83	2SC2668
Q50	8-729-266-83	2SC2668
Q51	8-729-103-19	2SA1206-K1
Q52	8-729-266-83	2SC2668
Q53	8-729-103-19	2SA1206-K1
Q54	8-729-800-42	2SK152
Q55	8-729-800-42	2SK152
Q56	8-729-103-19	2SA1206-K1
Q57	8-729-266-83	2SC2668
Q58	8-729-266-83	2SC2668
Q59	8-729-266-83	2SC2668
Q60	8-729-103-19	2SA1206-K1
Q61	8-729-266-83	2SC2668
Q62	8-729-266-83	2SC2668
Q63	8-729-266-83	2SC2668
Q64	8-729-103-19	2SA1206-K1
Q65	8-729-266-83	2SC2668
Q66	8-729-110-53	2SA1005
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-266-83	2SC2668
Q69	8-729-110-53	2SA1005
Q70	8-729-800-42	2SK152
Q71	8-729-266-83	2SC2668
Q72	8-729-266-83	2SC2668
Q73	8-729-800-42	2SK152
Q74	8-729-266-83	2SC2668
Q75	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q76	8-729-266-83	2SC2668
Q77	8-729-103-19	2SA1206-K1
Q78	8-729-266-83	2SC2668
Q79	8-729-266-83	2SC2668
Q80	8-729-103-19	2SA1206-K1
Q81	8-729-103-19	2SA1206-K1
R310	1-216-034-00	METAL CHIP 240 5% 1/10W
R320	1-216-053-00	METAL CHIP 1.5K 5% 1/10W
R321	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
RV1	1-228-455-00	METAL 500
RV2	1-228-455-00	METAL 500
RV3	1-228-455-00	METAL 500
RV4	1-228-455-00	METAL 500
RV5	1-228-452-00	METAL 50
RV6	1-228-452-00	METAL 50
RV7	1-228-455-00	METAL 500
RV8	1-228-455-00	METAL 500
RV9	1-228-454-00	METAL 200
RV10	1-228-454-00	METAL 200
RV11	1-228-457-00	METAL 2K
RV12	1-228-457-00	METAL 2K
RV13	1-228-454-00	METAL 200
RV14	1-228-455-00	METAL 500
RV16	1-228-459-00	METAL 10K
RV17	1-228-455-00	METAL 500
RV18	1-228-455-00	METAL 500
RV19	1-228-455-00	METAL 500
RV20	1-228-454-00	METAL 200
RV21	1-228-454-00	METAL 200
RV22	1-228-455-00	METAL 500
RV23	1-228-457-00	METAL 2K
RV24	1-228-458-00	METAL 5K
RV25	1-228-454-00	METAL 200
RV26	1-228-470-00	METAL 500
RV27	1-228-458-00	METAL 5K
RV28	1-228-471-00	METAL 1K
RV29	1-228-455-00	METAL 500

KY-98 BOARD

Ref.No.	Part No.	Description
	A-7513-480-A	MOUNTED CIRCUIT BOARD "KY-98"
	1-518-450-31	PILOT LAMP
CN1	1-564-018-11	RECEPTACLE, 8P MALE
	1-562-153-00	PLUG, HOUSING 8P
	1-564-026-00	PLUG, CONTACT
CN2	1-564-018-11	RECEPTACLE, 8P MALE
	1-562-153-00	PLUG, HOUSING 8P
	1-564-026-00	PLUG, CONTACT
IC1	8-759-902-44	SN74LS244N: TI
IC2	8-759-202-90	TC74HC147P: TOSHIBA
IC3	8-759-203-09	TC74HC237P: TOSHIBA
IC4	8-759-203-09	TC74HC237P: TOSHIBA
IC5	8-759-954-68	SN75468N: TI
IC6	8-759-954-68	SN75468N: TI
RB1	1-231-502-00	510X4
RB2	1-231-509-00	1KX4
RB3	1-231-533-00	10KX4
RB4	1-231-533-00	10KX4
RB5	1-231-533-00	10KX4
S1	1-570-516-91	PUSH
S2	1-570-516-91	PUSH
S3	1-570-516-91	PUSH
S4	1-570-516-91	PUSH
S5	1-570-516-91	PUSH
S6	1-570-516-91	PUSH
S7	1-570-516-91	PUSH
S8	1-570-516-91	PUSH
S9	1-570-516-91	PUSH

KY-99 BOARD

Ref.No.	Part No.	Description
	A-7615-189-A	KY-99 ASSY
	1-563-722-11	HOUSING, MICRO CONNECTOR 4P
C3	1-161-894-00	CERAMIC 0.1 50V
C4	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-161-894-00	CERAMIC 0.1 50V
C12	1-161-894-00	CERAMIC 0.1 50V
C13	1-161-894-00	CERAMIC 0.1 50V
C14	1-161-894-00	CERAMIC 0.1 50V
C15	1-124-147-00	ELECT 47 20% 25V
C16	1-161-894-00	CERAMIC 0.1 50V
C17	1-161-894-00	CERAMIC 0.1 50V
C18	1-161-894-00	CERAMIC 0.1 50V
C19	1-161-894-00	CERAMIC 0.1 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C23	1-161-894-00	CERAMIC 0.1 50V
C24	1-161-894-00	CERAMIC 0.1 50V
C25	1-124-148-00	ELECT 100 20% 25V
C26	1-124-555-00	ELECT 1000 20% 16V
C27	1-161-894-00	CERAMIC 0.1 50V
C28	1-124-471-00	ELECT 1000 20% 6.3V
C29	1-161-894-00	CERAMIC 0.1 50V
C30	1-124-148-00	ELECT 100 20% 25V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C33	1-161-894-00	CERAMIC 0.1 50V
C34	1-161-894-00	CERAMIC 0.1 50V
C35	1-124-486-00	ELECT 1000 20% 16V
C36	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C41	1-161-894-00	CERAMIC 0.1 50V
C42	1-161-894-00	CERAMIC 0.1 50V
C43	1-161-894-00	CERAMIC 0.1 50V

Ref.No.	Part No.	Description
C44	1-161-894-00	CERAMIC 0.1 50V
C45	1-161-894-00	CERAMIC 0.1 50V
C46	1-124-147-00	ELECT 47 20% 25V
C49	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C51	1-161-894-00	CERAMIC 0.1 50V
C52	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894-00	CERAMIC 0.1 50V
C64	1-161-894-00	CERAMIC 0.1 50V
C70	1-124-471-00	ELECT 1000 20% 6.3V
C71	1-161-887-11	CERAMIC 0.0068 50V
C72	1-161-887-11	CERAMIC 0.0068 50V
C73	1-161-887-11	CERAMIC 0.0068 50V
C74	1-161-887-11	CERAMIC 0.0068 50V
C75	1-124-471-00	ELECT 1000 20% 6.3V
C77	1-161-896-11	CERAMIC 0.22 50V
C78	1-161-896-11	CERAMIC 0.22 50V
C79	1-161-896-11	CERAMIC 0.22 50V
C80	1-161-896-11	CERAMIC 0.22 50V
C81	1-161-896-11	CERAMIC 0.22 50V
C82	1-161-896-11	CERAMIC 0.22 50V
C83	1-161-896-11	CERAMIC 0.22 50V
C84	1-161-896-11	CERAMIC 0.22 50V
C85	1-161-888-00	CERAMIC 0.01 50V
C86	1-161-888-00	CERAMIC 0.01 50V
C87	1-161-888-00	CERAMIC 0.01 50V
C88	1-161-888-00	CERAMIC 0.01 50V
C89	1-161-888-00	CERAMIC 0.01 50V
C90	1-161-888-00	CERAMIC 0.01 50V
C91	1-161-888-00	CERAMIC 0.01 50V
C92	1-161-888-00	CERAMIC 0.01 50V
C93	1-161-485-00	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V
CN1	1-564-083-00	RECEPTACLE, 40P MALE
CN4	1-563-723-11	RECEPTACLE, 40P MALE
CN5	1-566-291-11	RECEPTACLE, 40P MALE
CN6	1-566-291-11	RECEPTACLE, 40P MALE
CN7	1-566-291-11	RECEPTACLE, 40P MALE
CN8	1-561-971-00	RECEPTACLE, 20P FEMALE
CN9	1-561-971-00	RECEPTACLE, 20P FEMALE
CN10	1-561-971-00	RECEPTACLE, 20P FEMALE
CN11	1-561-971-00	RECEPTACLE, 20P FEMALE
CN12	1-561-971-00	RECEPTACLE, 20P FEMALE
CN13	1-561-971-00	RECEPTACLE, 20P FEMALE
CN16	1-563-725-11	RECEPTACLE, 60P FEMALE
CN17	1-563-725-11	RECEPTACLE, 60P FEMALE
CN18	1-563-725-11	RECEPTACLE, 60P FEMALE
CN19	1-563-725-11	RECEPTACLE, 60P FEMALE
CN20	1-563-725-11	RECEPTACLE, 60P FEMALE
CN21	1-563-725-11	RECEPTACLE, 60P FEMALE
CN25	1-563-723-11	RECEPTACLE, 1P FEMALE
CN26	1-563-723-11	RECEPTACLE, 1P FEMALE
CN27	1-563-723-11	RECEPTACLE, 1P FEMALE
CN28	1-563-723-11	RECEPTACLE, 1P FEMALE
CN29	1-563-723-11	RECEPTACLE, 1P FEMALE
CN30	1-563-723-11	RECEPTACLE, 1P FEMALE
CN31	1-563-723-11	RECEPTACLE, 1P FEMALE
CN32	1-563-723-11	RECEPTACLE, 1P FEMALE
CN33	1-563-723-11	RECEPTACLE, 1P FEMALE
CN34	1-563-723-11	RECEPTACLE, 1P FEMALE
CN35	1-563-723-11	RECEPTACLE, 1P FEMALE
CN36	1-563-723-11	RECEPTACLE, 1P FEMALE
CN37	1-563-723-11	RECEPTACLE, 1P FEMALE
CN38	1-563-723-11	RECEPTACLE, 1P FEMALE
CN39	1-563-723-11	RECEPTACLE, 1P FEMALE
CN40	1-563-723-11	RECEPTACLE, 1P FEMALE
CN41	1-563-723-11	RECEPTACLE, 1P FEMALE
CN42	1-563-723-11	RECEPTACLE, 1P FEMALE
CN43	1-563-723-11	RECEPTACLE, 1P FEMALE
CN44	1-563-723-11	RECEPTACLE, 1P FEMALE
CN45	1-563-723-11	RECEPTACLE, 1P FEMALE
CN46	1-563-723-11	RECEPTACLE, 1P FEMALE
CN47	1-563-723-11	RECEPTACLE, 1P FEMALE
CN48	1-563-723-11	RECEPTACLE, 1P FEMALE
CN49	1-563-723-11	RECEPTACLE, 1P FEMALE
CN50	1-563-723-11	RECEPTACLE, 1P FEMALE
CN51	1-563-723-11	RECEPTACLE, 1P FEMALE
CN52	1-563-723-11	RECEPTACLE, 1P FEMALE
CN53	1-563-723-11	RECEPTACLE, 1P FEMALE
CN54	1-563-723-11	RECEPTACLE, 1P FEMALE
CN55	1-563-723-11	RECEPTACLE, 1P FEMALE

Ref.No.	Part No.	Description
D1	8-719-210-12	10DF2
D2	8-719-210-12	10DF2
D3	8-719-210-12	10DF2
D4	8-719-210-12	10DF2
D5	8-719-210-12	10DF2
D6	8-719-210-12	10DF2
D7	8-719-210-12	10DF2
D8	8-719-210-12	10DF2
D9	8-719-210-12	10DF2
D10	8-719-210-12	10DF2
D11	8-719-210-12	10DF2
D12	8-719-210-12	10DF2
D13	8-719-210-12	10DF2
D14	8-719-210-12	10DF2
D15	8-719-210-12	10DF2
D16	8-719-210-12	10DF2
D17	8-719-210-12	10DF2
D18	8-719-210-12	10DF2
D19	8-719-210-12	10DF2
D20	8-719-210-12	10DF2
D21	8-719-210-12	10DF2
D22	8-719-210-12	10DF2
D23	8-719-210-12	10DF2
D24	8-719-210-12	10DF2
D25	8-719-210-12	10DF2
D26	8-719-210-12	10DF2
D27	8-719-210-12	10DF2
D28	8-719-210-12	10DF2
D29	8-719-815-55	1S1555
D30	8-719-815-55	1S1555
D31	8-719-815-55	1S1555
D32	8-719-815-55	1S1555
D33	8-719-815-55	1S1555
D34	8-719-815-55	1S1555
D35	8-719-815-55	1S1555
D36	8-719-815-55	1S1555
D37	8-719-815-55	1S1555
D38	8-719-815-55	1S1555
D39	8-719-815-55	1S1555
D40	8-719-815-55	1S1555
D41	8-719-815-12	1S1555
D42	8-719-921-55	SLP155B
D43	8-719-900-92	GL-9PR20
D44	8-719-900-92	GL-9PR20
D45	8-719-900-92	GL-9PR20

Ref.No.	Part No.	Description
D46	8-719-921-55	SLP155B
D47	8-719-941-29	5082-7300
D48	8-719-941-29	5082-7300
D49	8-719-941-29	5082-7300
IC1	8-759-200-08	TC40H367P: TOSHIBA
IC2	8-759-100-88	uPD8279C-5: NEC
IC3	8-759-906-41	SN74LS641N: TI
IC4	8-759-901-45	SN74LS145N: TI
IC5	8-759-954-68	SN75468N: TI
IC6	8-759-901-38	SN74LS138N: TI
IC7	8-759-954-68	SN75468N: TI
IC8	8-759-900-04	SN74LS04N: TI
IC9	8-759-206-41	TD62083AP: TOSHIBA
IC11	8-759-100-88	uPD8279C-5: NEC
IC12	8-759-901-45	SN74LS145N: TI
IC13	8-759-901-38	SN74LS138: TI
IC14	8-759-906-41	SN74LS641N: TI
IC15	8-759-926-31	AM26LS31PC: ADVANCED MICRO DEVICES
IC16	8-759-926-31	AM26LS31PC: ADVANCED MICRO DEVICES
IC17	8-759-200-08	TC40H367P: TOSHIBA
IC18	8-759-200-43	TC40H244P: TOSHIBA
IC19	8-759-200-43	TC40H244P: TOSHIBA
IC20	8-759-200-43	TC40H244P: TOSHIBA
IC21	8-759-100-88	uPD8279C-5: NEC
IC22	8-741-141-20	BX-1412: SONY
IC23	8-741-141-20	BX-1412: SONY
IC24	8-741-141-20	BX-1412: SONY
IC25	8-759-200-43	TC40H244P: TOSHIBA
IC26	8-759-200-44	TC40H245P: TOSHIBA
IC27	8-759-200-43	TC40H244P: TOSHIBA
IC28	8-759-200-46	TC40H273P: TOSHIBA
IC29	8-759-200-46	TC40H273P: TOSHIBA
IC30	8-759-200-22	TC40H138P: TOSHIBA
IC31	8-759-954-68	SN75468N: TI
IC32	8-759-954-68	SN75468N: TI
IC33	8-759-954-68	SN75468N: TI
IC34	8-759-200-22	TC40H138P: TOSHIBA
IC35	8-759-990-82	TL082CP: TI
IC36	8-759-200-22	TC40H138P: TOSHIBA

Ref.NO.	Part No.	Description
IC37	8-759-220-04	TC40H004P: TOSHIBA
IC39	8-759-220-00	TC40H000P: TOSHIBA
IC41	8-759-901-45	SN74LS145N: TI
IC42	8-759-901-39	SN74LS139N: TI
IC43	8-759-906-41	SN74LS641N: TI
IC44	8-759-200-46	TC40H273P: TOSHIBA
IC45	8-759-200-50	TC40H374P: TOSHIBA
IC47	8-759-200-22	TC40H138P: TOSHIBA
IC48	8-759-200-22	TC40H138P: TOSHIBA
IC49	8-759-200-22	TC40H138P: TOSHIBA
IC51	8-759-220-04	TC40H004P: TOSHIBA
IC52	8-759-200-17	TC40H027P: TOSHIBA
IC53	8-759-200-43	TC40H244P: TOSHIBA
IC54	8-759-200-43	TC40H244P: TOSHIBA
IC55	8-759-240-49	TC4049BP: TOSHIBA
IC56	8-759-200-08	TC40H367P: TOSHIBA
IC57	8-759-240-49	TC4049BP: TOSHIBA
IC58	8-759-200-08	TC40H367P: TOSHIBA
IC59	8-759-220-32	TC40H032P: TOSHIBA
IC60	8-759-240-49	TC4049BP: TOSHIBA
IC61	8-759-240-49	TC4049BP: TOSHIBA
IC62	8-759-240-49	TC4049BP: TOSHIBA
IC63	8-759-990-82	TL082CP: TI
IC64	8-759-990-84	TL084CN: TI
IC65	8-759-990-84	TL084CN: TI
IC66	8-759-990-84	TL084CN: TI
IC67	8-759-990-84	TL084CN: TI
IC68	8-759-106-58	uPD7004C: NEC
IC69	8-759-106-58	uPD7004C: NEC
IC70	8-759-223-68	TC40H368P: TOSHIBA
IC71	8-759-200-43	TC40H244P: TOSHIBA
IC72	8-759-926-32	AM26LS32PC: ADVANCE MICRO DEVICES
IC73	8-759-926-31	AM26LS31PC: ADVANCE MICRO DEVICES
IC74	8-759-926-31	AM26LS31PC: ADVANCE MICRO DEVICES
IC75	8-759-926-31	AM26LS31PC: ADVANCE MICRO DEVICES
IC76	8-759-220-74	TC40H074P: TOSHIBA
IC77	8-759-954-68	SN75468N: TI
IC78	8-759-200-46	TC40H273P: TI
IC79	8-759-954-68	SN75468N: TI
IC81	8-759-902-44	SN74LS244N: TI
IC82	8-759-221-75	TC40H175P: TOSHIBA
IC83	8-759-200-08	TC40H367P: TOSHIBA
IC85	8-759-939-38	DAP801: ROHM
IC86	8-759-939-39	DAN801: ROHM
IC87	8-759-939-38	DAP801: ROHM
IC88	8-759-939-39	DAN801: ROHM
IC89	8-759-003-17	LM317T: NSC
IC90	8-759-903-37	LM337T: NSC
IC91	8-759-913-44	TL317P: TI
L1	1-421-329-00	CHOKE 10
Q3	8-729-195-23	2SA952
Q4	8-729-195-23	2SA952
Q5	8-729-195-23	2SA952
Q6	8-729-195-23	2SA952
Q7	8-729-195-23	2SA952
Q8	8-729-195-23	2SA952
Q9	8-729-195-23	2SA952
Q10	8-729-195-23	2SA952
Q11	8-729-195-23	2SA952
Q12	8-729-195-23	2SA952
Q13	8-729-195-23	2SA952
Q14	8-729-195-23	2SA952
Q15	8-729-195-23	2SA952
Q16	8-729-195-23	2SA952
Q17	8-729-195-23	2SA952
Q18	8-729-195-23	2SA952
Q20	8-729-195-23	2SA952
R37	1-247-704-11	CARBON 220 5% 1/4W
R45	1-247-704-11	CARBON 220 5% 1/4W
R61	1-247-704-11	CARBON 220 5% 1/4W
R63	1-247-704-11	CARBON 220 5% 1/4W
R64	1-247-704-11	CARBON 220 5% 1/4W
R78	1-247-704-11	CARBON 220 5% 1/4W

Ref.No.	Part No.	Description
RB1	1-231-408-00	5100
RB2	1-231-385-00	4700
RB3	1-231-408-00	5100
RB4	1-231-385-00	4700
RB5	1-231-408-00	5100
RB6	1-231-410-00	10K
RB7	1-231-410-00	10K
RB8	1-231-410-00	10K
RB9	1-231-410-00	10K
RB10	1-231-509-00	CIRCUIT BLOCK
RB11	1-231-410-00	10K
RB12	1-231-410-00	10K
RB13	1-231-410-00	10K
RB14	1-231-410-00	10K
RB15	1-231-516-00	2KX4
RB16	1-231-509-00	1KX4
RB17	1-231-408-00	5100
RB18	1-231-408-00	5100
RB19	1-231-410-00	10K
RB20	1-231-410-00	10K
RV1	1-228-452-00	METAL 50
RV2	1-228-452-00	METAL 50
RV3	1-237-494-11	METAL 5K
RV4	1-237-494-11	METAL 5K
RV5	1-228-456-00	METAL 1K
RV6	1-237-494-11	METAL 5K
RV7	1-237-494-11	METAL 5K
RV8	1-237-494-11	METAL 5K
RV9	1-237-494-11	METAL 5K
RV10	1-237-494-11	METAL 5K
RV11	1-237-494-11	METAL 5K
RV12	1-228-453-00	METAL 100
RV14	1-228-455-11	METAL 500
RV16	1-230-995-11	METAL 5K
RV17	1-228-457-00	METAL 2K
RV18	1-228-457-00	METAL 2K
RY1	1-515-644-11	167Ω5V
RY2	1-515-644-11	167Ω5V
RY3	1-515-644-11	167Ω5V
RY4	1-515-644-11	167Ω5V
RY5	1-515-644-11	167Ω5V

Ref.No.	Part No.	Description
RY6	1-515-644-11	167 5V
RY7	1-515-644-11	167 5V
RY8	1-515-644-11	167 5V
RY9	1-515-644-11	167 5V
S1	1-554-048-00	PUSH
S2	1-554-048-00	PUSH
S3	1-554-041-11	PUSH
S4	1-554-041-11	PUSH
S5	1-570-516-91	PUSH
S6	1-570-516-91	PUSH
S7	1-570-516-91	PUSH
S8	1-570-516-91	PUSH
S9	1-570-516-91	PUSH
S10	1-570-516-91	PUSH
S11	1-570-516-91	PUSH
S12	1-570-516-91	PUSH
S13	1-570-516-91	PUSH
S14	1-570-516-91	PUSH
S15	1-570-516-91	PUSH
S16	1-570-516-91	PUSH
S17	1-570-516-91	PUSH
S18	1-570-516-91	PUSH
S19	1-570-516-91	PUSH
S20	1-570-516-91	PUSH
S21	1-570-516-91	PUSH
S22	1-570-516-91	PUSH
S23	1-570-516-91	PUSH
S24	1-570-516-91	PUSH
S25	1-570-516-91	PUSH
S26	1-570-516-91	PUSH
S27	1-570-516-91	PUSH
S28	1-570-516-91	PUSH
S29	1-570-516-91	PUSH
S30	1-570-516-91	PUSH
S31	1-570-516-91	PUSH
S32	1-570-516-91	PUSH
S33	1-570-516-91	PUSH
S34	1-570-516-91	PUSH
S35	1-554-041-11	PUSH
S36	1-570-207-41	PUSH
S37	1-570-207-41	PUSH
S38	1-554-048-00	PUSH
S39	1-554-041-11	PUSH
S40	1-554-041-11	PUSH

Ref.No.	Part No.	Description
S41	1-554-041-11	PUSH
S42	1-554-041-11	PUSH
S43	1-554-041-11	PUSH
S44	1-554-041-11	PUSH
S45	1-570-516-91	PUSH
S46	1-570-516-91	PUSH
S47	1-554-048-00	PUSH
S48	1-570-516-91	PUSH
S49	1-570-516-91	PUSH
S50	1-554-045-41	PUSH
S51	1-554-048-00	PUSH
S52	1-554-041-11	PUSH
S53	1-570-207-41	PUSH
S54	1-570-207-41	PUSH
S55	1-554-041-11	PUSH
S56	1-554-041-11	PUSH
S57	1-554-041-11	PUSH
S58	1-554-041-11	PUSH
S59	1-554-041-11	PUSH
S60	1-554-041-11	PUSH
S61	1-570-516-91	PUSH
S62	1-570-516-91	PUSH
S63	1-554-048-00	PUSH
S64	1-570-045-51	PUSH
S65	1-554-045-31	PUSH
S66	1-554-048-00	PUSH
VDR1	1-806-504-11	DK820
VDR2	1-806-504-11	DK820

RE-26 BOARD

Ref.No.	Part No.	Description
	A-7513-475-A	MOUNTED CIRCUIT BOARD "RE-26"
C2	1-131-348-00	TANTALUM 1.5 10% 35V
C6	1-161-894-00	CERAMIC 0.1 50V
C7	1-126-086-61	ELECT 6800 20% 16V
C8	1-124-555-00	ELECT 1000 20% 16V
C9	1-126-086-61	ELECT 6800 20% 16V
CN1	1-508-765-00	RECEPTACLE, 3P MALE
CN2	1-508-765-00	RECEPTACLE, 3P MALE
CN3	1-508-765-00	RECEPTACLE, 3P MALE
CN4	1-560-008-00	RECEPTACLE, 3P MALE
CN5	1-508-901-00	RECEPTACLE, 3P MALE
CN7	1-508-766-00	RECEPTACLE, 4P MALE
	1-509-893-00	PLUG, HOUSING 4P
	1-509-899-00	PLUG, CONTACT
CN8	1-508-765-00	RECEPTACLE, 3P MALE
D1	8-719-200-02	10E-2
D2	8-719-200-02	10E-2
IC1	8-759-145-58	uPC4558C: NEC
IC2	8-759-905-80	AD580M: ANALOG DEVICES
R6	1-207-909-00	WIREWOUND 3.9 10% 3W
RV1	1-230-746-11	METAL 500
RV2	1-230-744-11	METAL 100
T1	1-464-741-11	DC-DC CONVERTER

SG-115 BOARD

Ref.No.	Part No.	Description
	A-7513-471-A	MOUNTED CIRCUIT BOARD "SG-115"
C3	1-161-894-00	CERAMIC 0.1 50V
C4	1-161-894-00	CERAMIC 0.1 50V
C5	1-102-106-00	CERAMIC 100PF 10% 50V
C6	1-130-483-00	FILM 0.01 5% 50V
C7	1-161-039-00	CERAMIC 0.001 10% 25V
C8	1-130-483-00	FILM 0.01 5% 50V
C9	1-131-347-00	TANTALUM 1 10% 35V
C11	1-161-894-00	CERAMIC 0.1 50V
C12	1-161-039-00	CERAMIC 0.001 10% 25V
C13	1-161-894-00	CERAMIC 0.1 50V
C14	1-161-894-00	CERAMIC 0.1 50V
C15	1-161-894-00	CERAMIC 0.1 50V
C16	1-124-584-00	ELECT 100 20% 10V
C17	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C18	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C19	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C23	1-161-894-00	CERAMIC 0.1 50V
C25	1-161-894-00	CERAMIC 0.1 50V
C27	1-161-894-00	CERAMIC 0.1 50V
C29	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C33	1-161-894-00	CERAMIC 0.1 50V
C34	1-107-077-00	MICA 47PF 5% 500V
C35	1-107-210-00	MICA 22PF 10% 500V
C36	1-107-045-00	MICA 3.9PF ±0.5PF 500V
C37	1-107-019-00	MICA 1PF ±0.5PF 500V
C38	1-161-894-00	CERAMIC 0.1 50V
C39	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C41	1-161-894-00	CERAMIC 0.1 50V
C43	1-161-894-00	CERAMIC 0.1 50V
C44	1-161-894-00	CERAMIC 0.1 50V
C45	1-102-110-00	CERAMIC 220PF 10% 50V
C48	1-161-894-00	CERAMIC 0.1 50V
C49	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C51	1-161-894-00	CERAMIC 0.1 50V
C52	1-161-894-00	CERAMIC 0.1 50V
C53	1-161-894-00	CERAMIC 0.1 50V
C54	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894-00	CERAMIC 0.1 50V
C63	1-161-894-00	CERAMIC 0.1 50V
C64	1-161-894-00	CERAMIC 0.1 50V
C65	1-161-894-00	CERAMIC 0.1 50V
C66	1-161-894-00	CERAMIC 0.1 50V
C76	1-161-894-00	CERAMIC 0.1 50V
C77	1-161-894-00	CERAMIC 0.1 50V
C82	1-102-110-00	CERAMIC 220PF 10% 50V
C83	1-124-143-00	ELECT 100 20% 16V
C86	1-102-106-00	CERAMIC 100PF 10% 50V
CN2	1-561-310-00	RECEPTACLE, RF
CN3	1-561-310-00	RECEPTACLE, RF
CN4	1-561-310-00	RECEPTACLE, RF
CN5	1-561-310-00	RECEPTACLE, RF
CN6	1-561-310-00	RECEPTACLE, RF
CN7	1-561-310-00	RECEPTACLE, RF
CN8	1-561-310-00	RECEPTACLE, RF
FB1	1-535-178-00	FERRITE BEADRING
FB2	1-535-178-00	FERRITE BEADRING
FB3	1-535-178-00	FERRITE BEADRING
IC1	8-759-901-23	SN74LS123N: TI
IC2	8-759-000-99	MC74HC74N: MOTOROLA
IC3	8-759-902-21	SN74LS221N: TI
IC4	8-759-918-71	CX23065: SONY
IC5	8-759-708-05	NJM78L05A: JRC
IC6	8-759-906-01	TL601CP: TI
IC7	8-759-904-14	SN74ALS04AN: TI
IC8	8-759-912-07	SN74ALS163AN: TI
IC9	8-759-202-11	TC74HC00P: TOSHIBA
IC10	8-759-202-32	TC74HC163P: TOSHIBA

Ref.No.	Part No.	Description
IC11	8-759-202-32	TC74HC163P: TOSHIBA
IC12	8-759-202-32	TC74HC163P: TOSHIBA
IC16	8-759-203-36	TC74HC374P: TOSHIBA
IC17	8-759-203-36	TC74HC374P: TOSHIBA
IC18	8-759-900-19	SN74128N: TI
IC19	8-759-202-12	TC74HC02P: TOSHIBA
IC20	8-759-202-32	TC74HC163P: TOSHIBA
IC21	8-759-202-32	TC74HC163P: TOSHIBA
IC23	8-759-000-99	MC74HC74N: MOTOROLA
IC24	8-759-202-14	IC74HC08P: TOSHIBA
IC25	8-759-203-36	TC74HC374P: TOSHIBA
IC26	8-759-903-74	SN74LS374N: TI
IC27	8-759-906-76	74F283PC: FSC
IC28	8-759-913-63	SN74ALS374N: TI
IC30	8-759-903-74	SN74LS374N: TI
IC31	8-759-202-12	TC74HC02P: TOSHIBA
IC32	8-759-202-32	TC74HC163P: TOSHIBA
IC33	8-759-202-32	TC74HC163P: TOSHIBA
IC34	8-759-202-74	TC74HC04P: TOSHIBA
Q1	8-729-178-54	2SC2785
Q2	8-729-117-54	2SA1175
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-178-54	2SC2785
Q5	8-729-178-54	2SC2785
Q6	8-729-117-54	2SA1175
Q7	8-729-117-54	2SA1175
Q8	8-729-117-54	2SA1175
Q9	8-729-178-54	2SC2785
Q10	8-729-178-54	2SC2785
Q11	8-729-178-54	2SC2785
Q12	8-729-178-54	2SC2785
Q13	8-729-266-83	2SC2668
Q14	8-729-178-54	2SC2785
Q15	8-729-117-54	2SA1175
Q16	8-729-178-54	2SC2785
Q17	8-729-178-54	2SC2785
Q18	8-729-117-54	2SA1175
Q19	8-729-117-54	2SA1175

Ref.No.	Part No.	Description
Q20	8-729-266-83	2SC2668
Q21	8-729-266-83	2SC2668
Q22	8-729-266-83	2SC2668
Q23	8-729-266-83	2SC2668
Q24	8-729-266-83	2SC2668
Q25	8-729-266-83	2SC2668
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
R85	1-216-752-11	METAL FOIL 1.667K
R86	1-216-749-11	METAL FOIL 847.5
R87	1-216-754-11	METAL FOIL 4.545K
R92	1-215-957-11	METAL FOIL 1.000K
R93	1-216-751-11	METAL FOIL 1.340K
R94	1-216-753-11	METAL FOIL 3.937K
R99	1-216-755-11	METAL FOIL 13.67K
R100	1-216-750-11	METAL FOIL 1.079K
R101	1-215-957-11	METAL FOIL 1.000K
RB1	1-235-948-11	750Ω/1.5K
RB2	1-235-948-11	750Ω/1.5K
RB3	1-231-533-00	10Kx4
RV1	1-228-470-00	METAL 500
RV2	1-228-454-00	METAL 200
RV3	1-228-454-00	METAL 200
RV4	1-228-454-00	METAL 200
RV5	1-228-455-00	METAL 500
RV6	1-228-456-00	METAL 1K
RV7	1-228-452-00	METAL 50
RV8	1-228-452-00	METAL 50
RV9	1-228-452-00	METAL 50
RV10	1-228-452-00	METAL 50
X1	1-567-782-11	24.57MHZ

SW-136 BOARD

Ref.No.	Part No.	Description
	A-7513-479-A	MOUNTED CIRCUIT BOARD "SW-136"
CN10	1-566-294-11	RECEPTACLE, 20P MALE
CN11	1-566-294-11	RECEPTACLE, 20P MALE
S1	1-570-919-11	PUSH
S2	1-570-919-11	PUSH
S3	1-570-919-11	PUSH
S4	1-570-919-11	PUSH
S5	1-570-919-11	PUSH
S6	1-570-919-11	PUSH
S7	1-570-919-11	PUSH
S8	1-570-919-11	PUSH
S9	1-570-919-11	PUSH
S10	1-570-919-11	PUSH
S11	1-570-919-11	PUSH
S12	1-570-919-11	PUSH
S13	1-570-919-11	PUSH
S14	1-570-919-11	PUSH
S15	1-570-919-11	PUSH
S16	1-570-919-11	PUSH
S17	1-570-919-11	PUSH
S18	1-570-919-11	PUSH
S19	1-570-919-11	PUSH
S20	1-570-919-11	PUSH

SY-63 BOARD

Ref.No.	Part No.	Description
	A-7513-468-A	MOUNTED CIRCUIT BOARD "SY-63"
BT1	1-528-171-11	BATTERY, STORAGE, NI-CD(GB50H)
C1	1-124-147-00	ELECT 47MF 20% 25V
C2	1-124-147-00	ELECT 47MF 20% 25V
C4	1-161-894-00	CERAMIC 0.1 50V
C5	1-161-894-00	CERAMIC 0.1 50V
C6	1-161-894-00	CERAMIC 0.1 50V
C7	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-161-894-00	CERAMIC 0.1 50V
C12	1-161-894-00	CERAMIC 0.1 50V
C13	1-161-894-00	CERAMIC 0.1 50V
C14	1-161-894-00	CERAMIC 0.1 50V
C15	1-161-894-00	CERAMIC 0.1 50V
C16	1-161-894-00	CERAMIC 0.1 50V
C17	1-161-894-00	CERAMIC 0.1 50V
C19	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C25	1-161-894-00	CERAMIC 0.1 50V
C26	1-161-894-00	CERAMIC 0.1 50V
C27	1-161-894-00	CERAMIC 0.1 50V
C28	1-161-894-00	CERAMIC 0.1 50V
C29	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C33	1-161-894-00	CERAMIC 0.1 50V
C34	1-161-894-00	CERAMIC 0.1 50V
C35	1-161-894-00	CERAMIC 0.1 50V
C36	1-161-894-00	CERAMIC 0.1 50V
C37	1-161-894-00	CERAMIC 0.1 50V
C38	1-161-894-00	CERAMIC 0.1 50V
C39	1-161-894-00	CERAMIC 0.1 50V
CN1	1-564-083-00	RECEPTACLE, 40P MALE
CN2	1-566-289-11	RECEPTACLE, 10P MALE
CN4	1-566-292-11	RECEPTACLE, 10P MALE
CN5	1-566-292-11	RECEPTACLE, 10P MALE

Ref.No.	Part No.	Description
D1	8-719-812-31	TLR123
D2	8-719-815-55	1S1555
D3	8-719-815-55	1S1555
IC1	8-759-926-32	AM26LS32PC: ADVANCED MICRO DEVICES
IC2	8-759-915-33	SN75154N-R: TI
IC3	8-759-926-31	AM26LS31PC: ADVANCED MICRO DEVICES
IC4	8-759-951-50	SN75150P: TI
IC5	8-759-202-55	TC74HC244P: TOSHIBA
IC6	8-759-202-56	TC74HC245P: TOSHIBA
IC7	8-759-202-55	TC74HC244P: TOSHIBA
IC8	8-759-917-43	SN74HC138N: TI
IC9	8-759-202-21	TC74HC32P: TOSHIBA
IC10	8-759-202-11	TC74HC00P: TOSHIBA
IC11	8-759-922-95	MSM82C51ARS: OKI
IC12	8-759-202-14	TC74HC08P: TOSHIBA
IC13	8-759-917-43	SN74HC138N: TI
IC14	8-759-202-21	TC74HC32P: TOSHIBA
IC15	8-759-202-12	TC74HC02P: TOSHIBA
IC16	8-759-202-32	TC74HC163P: TOSHIBA
IC17	8-759-203-68	TC74HC4040P: TOSHIBA
IC18	8-759-202-33	TC74HC240P: TOSHIBA
IC20	8-759-900-68	SN74ALS30AN: TI
IC21	8-759-202-21	TC74HC32P: TOSHIBA
IC22	8-759-202-74	TC74HC04P: TOSHIBA
IC23	8-759-202-17	TC74HC14P: TOSHIBA
IC24	8-759-913-41	S-8054ALB: DAINI SEIKO
IC25	8-759-202-74	TC74HC04P: TOSHIBA
IC26	8-759-000-99	MC74HC74N: MOTOROLA
IC27	8-759-900-69	SN74ALS74N: TI
IC28	8-759-904-14	SN74ALS04N: TI
IC29	8-759-917-43	SN74HC138N: TI
IC30	8-759-202-56	TC74HC245P: TOSHIBA
IC31	8-759-203-35	TC74HC373P: TOSHIBA
IC32	8-759-939-37	MSM80C851A-2RS: OKI
IC33	8-759-202-21	TC74HC32P: TOSHIBA
IC34	8-759-206-27	TC5564PL-15: TOSHIBA
IC35	8-759-206-27	TC5564PL-15: TOSHIBA
IC36	8-759-206-27	TC5564PL-15: TOSHIBA

Ref.No.	Part No.	Description
IC37	8-759-206-27	TC5564PL-15: TOSHIBA
IC42	8-759-112-63	uPD4701AC: NEC
IC43	8-759-202-17	TC74HC14P: TOSHIBA
Q1	8-729-281-52	2SC1815-Y
Q2	8-729-201-52	2SA1015
RB1	1-231-410-00	10K
RB2	1-231-410-00	10K
RB3	1-231-533-00	10KX4
RB4	1-231-410-00	10K
RB5	1-231-410-00	10K
RB6	1-231-408-00	5100
S1	1-553-637-00	SLIDE
S3	1-516-923-21	DIP
S4	1-553-943-31	DIP
S5	1-516-925-21	DIP
X1	1-527-431-00	9830.4KHZ
X2	1-527-848-00	8MHZ

TG-25 BOARD

Ref.No.	Part No.	Description
	A-7513-469-A	MOUNTED CIRCUIT BOARD "TG-25"
C1	1-161-894-00	CERAMIC 0.1 50V
C4	1-161-894-00	CERAMIC 0.1 50V
C5	1-161-894-00	CERAMIC 0.1 50V
C6	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C12	1-102-114-00	CERAMIC 470P 10% 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C23	1-161-894-00	CERAMIC 0.1 50V
C24	1-161-894-00	CERAMIC 0.1 50V
C26	1-161-894-00	CERAMIC 0.1 50V
C28	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C39	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C41	1-161-894-00	CERAMIC 0.1 50V
C42	1-161-894-00	CERAMIC 0.1 50V
C44	1-161-894-00	CERAMIC 0.1 50V
C49	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C52	1-161-894-00	CERAMIC 0.1 50V
C53	1-161-894-00	CERAMIC 0.1 50V
C54	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894-00	CERAMIC 0.1 50V
C63	1-161-894-00	CERAMIC 0.1 50V
C64	1-161-894-00	CERAMIC 0.1 50V
C67	1-161-894-00	CERAMIC 0.1 50V
C69	1-161-894-00	CERAMIC 0.1 50V
C71	1-161-894-00	CERAMIC 0.1 50V
C73	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C77	1-161-894-00	CERAMIC 0.1 50V
C78	1-161-894-00	CERAMIC 0.1 50V
C79	1-161-894-00	CERAMIC 0.1 50V
C89	1-102-110-00	CERAMIC 220P 10% 50V
C93	1-161-894-00	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V
C95	1-161-894-00	CERAMIC 0.1 50V
C96	1-161-894-00	CERAMIC 0.1 50V
C97	1-161-894-00	CERAMIC 0.1 50V
C98	1-161-894-00	CERAMIC 0.1 50V
C99	1-161-894-00	CERAMIC 0.1 50V
C100	1-161-894-00	CERAMIC 0.1 50V
C102	1-161-894-00	CERAMIC 0.1 50V
C104	1-161-894-00	CERAMIC 0.1 50V
C121	1-161-894-00	CERAMIC 0.1 50V
C122	1-161-894-00	CERAMIC 0.1 50V
C123	1-161-894-00	CERAMIC 0.1 50V
C126	1-161-894-00	CERAMIC 0.1 50V
C127	1-161-894-00	CERAMIC 0.1 50V
CN1	1-563-721-11	RECEPTACLE, RF
CN2	1-563-721-11	RECEPTACLE, RF
CN3	1-563-721-11	RECEPTACLE, RF
CN4	1-563-721-11	RECEPTACLE, RF
CN5	1-563-721-11	RECEPTACLE, RF
D1	8-719-100-27	RD4.7EB2
D2	8-719-100-30	RD5.1EB2
D3	8-719-100-30	RD5.1EB2
D6	8-719-100-30	RD5.1EB2
D7	8-719-911-19	1SS119
D8	8-719-911-19	1SS119
D9	8-719-911-19	1SS119
D10	8-719-911-19	1SS119
D11	8-719-911-19	1SS119
D12	8-719-911-19	1SS119
D13	8-719-911-19	1SS119
D14	8-719-911-19	1SS119
D15	8-719-911-19	1SS119
D16	8-719-911-19	1SS119

Ref.No.	Part No.	Description
D17	8-719-911-19	1SS119
D18	8-719-911-19	1SS119
D19	8-719-911-19	1SS119
D20	8-719-911-19	1SS119
D21	8-719-911-19	1SS119
D22	8-719-911-19	1SS119
D23	8-719-911-19	1SS119
D24	8-719-911-19	1SS119
D25	8-719-911-19	1SS119
D26	8-719-911-19	1SS119
D27	8-719-911-19	1SS119
D28	8-719-911-19	1SS119
D30	8-719-911-19	1SS119
D31	8-719-911-19	1SS119
D32	8-719-911-19	1SS119
D33	8-719-911-19	1SS119
D34	8-719-908-10	QSCH-1754
DL2	1-415-184-31	50nS
DL2	1-415-184-31	50nS
DL2	1-415-184-31	50nS
FB1	1-535-178-00	FERRITE BEADRING
FB2	1-535-178-00	FERRITE BEADRING
FB3	1-535-178-00	FERRITE BEADRING
FB4	1-535-178-00	FERRITE BEADRING
FL1	1-235-950-11	LOW PASS 12MHz
FL2	1-235-950-11	LOW PASS 12MHz
FL3	1-235-950-11	LOW PASS 12MHz
IC1	8-759-939-56	MS1002-3: PLESSY
IC2	8-759-939-56	MS1002-3: PLESSY
IC4	8-759-910-04	SN74S04N: TI
IC5	8-759-902-21	SN74LS221N: TI
IC6	8-759-905-27	NE527H: SIGNETICS
IC7	8-759-918-71	CX23065: SONY
IC8	8-759-905-27	NE527H: SIGNETICS
IC9	8-759-923-77	HI1-5043-5: HARRIS
IC10	8-759-923-77	HI1-5043-5: HARRIS
IC11	8-759-990-84	TL084CN: TI

Ref.No.	Part No.	Description
IC12	8-759-990-84	TL084CN: TI
IC13	8-759-990-84	TL084CN: TI
IC14	8-759-203-01	TC74HC175P: TOSHIBA
IC15	8-759-203-61	TC74HC688P: TOSHIBA
IC16	8-759-901-23	SN74LS123N: TI
Q1	8-729-266-83	2SC2668
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-266-83	2SC2668
Q5	8-729-266-83	2SC2668
Q6	8-729-110-53	2SA1005
Q7	8-729-266-83	2SC2668
Q8	8-729-266-83	2SC2668
Q9	8-729-266-83	2SC2668
Q10	8-729-103-19	2SA1206-K1
Q11	8-729-178-62	2SC2786-L
Q12	8-729-178-62	2SC2786-L
Q13	8-729-178-62	2SC2786-L
Q14	8-729-110-53	2SA1005
Q15	8-729-178-62	2SC2786-L
Q16	8-729-110-53	2SA1005
Q17	8-729-190-12	2SC2901
Q18	8-729-103-19	2SA1206-K1
Q19	8-729-190-12	2SC2901
Q20	8-729-103-19	2SA1206-K1
Q21	8-729-190-12	2SC2901
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-190-12	2SC2901
Q24	8-729-103-19	2SA1206-K1
Q25	8-729-110-53	2SA1005
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
Q30	8-729-266-83	2SC2668
Q31	8-729-266-83	2SC2668
Q32	8-729-266-83	2SC2668
Q33	8-729-266-83	2SC2668
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q36	8-729-266-83	2SC2668
Q37	8-729-266-83	2SC2668
Q38	8-729-110-53	2SA1005
Q39	8-729-266-83	2SC2668
Q40	8-729-266-83	2SC2668
Q41	8-729-266-83	2SC2668
Q42	8-729-110-53	2SA1005
Q43	8-729-266-83	2SC2668
Q44	8-729-266-83	2SC2668
Q45	8-729-266-83	2SC2668
Q46	8-729-266-83	2SC2668
Q47	8-729-266-83	2SC2668
Q48	8-729-266-83	2SC2668
Q49	8-729-266-83	2SC2668
Q50	8-729-266-83	2SC2668
Q51	8-729-266-83	2SC2668
Q52	8-729-266-83	2SC2668
Q53	8-729-103-19	2SA1206-K1
Q54	8-729-103-19	2SA1206-K1
Q55	8-729-103-19	2SA1206-K1
Q56	8-729-103-19	2SA1206-K1
Q57	8-729-103-19	2SA1206-K1
Q58	8-729-266-83	2SC2668
Q59	8-729-110-53	2SA1005
Q60	8-729-266-83	2SC2668
Q61	8-729-103-19	2SA1206-K1
Q62	8-729-103-19	2SA1206-K1
Q63	8-729-266-83	2SC2668
Q64	8-729-266-83	2SC2668
Q65	8-729-266-83	2SC2668
Q66	8-729-266-83	2SC2668
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-103-19	2SA1206-K1
Q69	8-729-103-19	2SA1206-K1
Q70	8-729-103-19	2SA1206-K1
Q71	8-729-103-19	2SA1206-K1
Q72	8-729-103-19	2SA1206-K1
Q73	8-729-103-19	2SA1206-K1
Q74	8-729-103-19	2SA1206-K1
Q75	8-729-103-19	2SA1206-K1
Q76	8-729-103-19	2SA1206-K1
Q77	8-729-103-19	2SA1206-K1
Q78	8-729-103-19	2SA1206-K1
Q79	8-729-103-19	2SA1206-K1
Q80	8-729-103-19	2SA1206-K1
Q81	8-729-103-19	2SA1206-K1
Q82	8-729-103-19	2SA1206-K1
Q83	8-729-103-19	2SA1206-K1
Q84	8-729-103-19	2SA1206-K1
Q85	8-729-266-83	2SC2668
Q86	8-729-266-83	2SC2668
Q87	8-729-266-83	2SC2668
Q88	8-729-266-83	2SC2668
Q89	8-729-266-83	2SC2668
Q90	8-729-266-83	2SC2668
Q91	8-729-266-83	2SC2668
Q92	8-729-266-83	2SC2668
Q93	8-729-266-83	2SC2668
Q100	8-729-266-83	2SC2668
Q101	8-729-266-83	2SC2668
Q102	8-729-266-83	2SC2668
Q103	8-729-266-83	2SC2668
Q104	8-729-266-83	2SC2668
Q105	8-729-266-83	2SC2668
Q106	8-729-266-83	2SC2668
Q107	8-729-266-83	2SC2668
Q108	8-729-266-83	2SC2668
Q109	8-729-266-83	2SC2668
Q110	8-729-266-83	2SC2668
Q111	8-729-266-83	2SC2668
Q112	8-729-266-83	2SC2668
Q113	8-729-178-54	2SC2785
Q114	8-729-178-54	2SC2785
Q115	8-729-178-54	2SC2785
Q116	8-729-266-83	2SC2668
Q117	8-729-266-83	2SC2668
Q118	8-729-266-83	2SC2668
Q119	8-729-103-19	2SA1206-K1
Q120	8-729-117-54	2SA1175
Q121	8-729-266-83	2SC2668
Q122	8-729-103-19	2SA1206-K1
Q123	8-729-266-83	2SC2668
Q130	8-729-190-12	2SC2901
Q131	8-729-266-83	2SC2668
Q132	8-729-103-19	2SA1206-K1
Q133	8-729-103-19	2SA1206-K1
Q134	8-729-103-19	2SA1206-K1
Q135	8-729-103-19	2SA1206-K1
Q136	8-729-103-19	2SA1206-K1
Q137	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q138	8-729-178-54	2SC2785
Q139	8-729-178-54	2SC2785
Q140	8-729-178-54	2SC2785
Q141	8-729-178-54	2SC2785
Q142	8-729-178-54	2SC2785
Q143	8-729-178-54	2SC2785
Q144	8-729-110-53	2SA1005
Q145	8-729-110-53	2SA1005
Q146	8-729-110-53	2SA1005
Q147	8-729-110-53	2SA1005
Q148	8-729-110-53	2SA1005
Q149	8-729-110-53	2SA1005
Q150	8-729-178-54	2SC2785
Q151	8-729-178-54	2SC2785
Q152	8-729-178-54	2SC2785
R108	1-215-439-00	METAL 5600 1% 1/6W
R111	1-215-390-00	METAL 51 1% 1/6W
R113	1-215-390-00	METAL 51 1% 1/6W
R196	1-216-752-11	METAL FOIL 1.667K
R197	1-215-957-11	METAL FOIL 1.000K
R198	1-216-755-11	METAL FOIL 13.67K
R199	1-216-749-11	METAL FOIL 847.5
R200	1-216-750-11	METAL FOIL 1.079K
R201	1-216-751-11	METAL FOIL 1.340K
R202	1-216-754-11	METAL FOIL 4.545K
R203	1-216-753-11	METAL FOIL 3.973K
R204	1-215-957-11	METAL FOIL 1.000K
R205	1-216-752-11	METAL FOIL 1.667K
R206	1-215-957-11	METAL FOIL 1.000K
R207	1-216-755-11	METAL FOIL 13.67K
R208	1-216-749-11	METAL FOIL 847.5
R209	1-216-750-11	METAL FOIL 1.079K
R210	1-216-751-11	METAL FOIL 1.340K
R211	1-216-754-11	METAL FOIL 4.545K
R212	1-216-753-11	METAL FOIL 3.973K
R213	1-215-957-11	METAL FOIL 1.000K
R325	1-216-752-11	METAL FOIL 1.667K
R326	1-216-749-11	METAL FOIL 847.5
R327	1-216-754-11	METAL FOIL 4.545K
R329	1-215-957-11	METAL FOIL 1.000K

Ref.No.	Part No.	Description
R330	1-216-751-11	METAL FOIL 1.340K
R331	1-216-753-11	METAL FOIL 3.937K
R333	1-215-957-11	METAL FOIL 1.000K
R334	1-216-750-11	METAL FOIL 1.079K
R335	1-216-755-11	METAL FOIL 13.67K
RV1	1-228-457-00	METAL 2K
RV2	1-228-460-00	METAL 20K
RV3	1-228-456-00	METAL 1K
RV4	1-228-462-00	METAL 100K
RV5	1-228-456-00	METAL 1K
RV6	1-228-456-00	METAL 1K
RV7	1-228-456-00	METAL 1K
RV8	1-228-456-00	METAL 1K
RV9	1-228-455-00	METAL 500
RV10	1-228-456-00	METAL 1K
RV11	1-228-457-00	METAL 2K
RV12	1-228-458-00	METAL 5K
RV13	1-228-458-00	METAL 5K
RV14	1-228-458-00	METAL 5K
RV15	1-228-459-00	METAL 10K
RV16	1-228-459-00	METAL 10K
RV17	1-228-459-00	METAL 10K
RV18	1-228-458-00	METAL 5K
RV19	1-228-458-00	METAL 5K
RV20	1-228-458-00	METAL 5K
RV21	1-228-462-00	METAL 100K
RV22	1-228-456-00	METAL 1K
RV23	1-228-458-00	METAL 5K
RV24	1-228-458-00	METAL 5K
RV25	1-228-455-00	METAL 500
RV26	1-228-455-00	METAL 500
RV27	1-228-455-00	METAL 500
RV28	1-228-457-00	METAL 2K
X1	1-567-784-11	28.7888MHZ

WP-18 BOARD

Ref.No.	Part No.	Description
	A-7513-473-A	MOUNTED CIRCUIT BOARD "WP-18"
C1	1-161-894-00	CERAMIC 0.1 50V
C5	1-163-038-00	CERAMIC CHIP 0.1 25V
C7	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C12	1-163-038-00	CERAMIC CHIP 0.1 25V
C15	1-161-894-00	CERAMIC 0.1 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-039-00	CERAMIC 0.001 10% 25V
C33	1-161-894-00	CERAMIC 0.1 50V
C36	1-161-894-00	CERAMIC 0.1 50V
C37	1-161-039-00	CERAMIC 0.001 10% 25V
C44	1-161-894-00	CERAMIC 0.1 50V
C46	1-161-894-00	CERAMIC 0.1 50V
C48	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C51	1-163-038-00	CERAMIC CHIP 0.1 25V
C53	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C63	1-131-347-00	TANTALUM 1 10% 35V
C68	1-161-888-00	CERAMIC 0.01 50V
C71	1-161-894-00	CERAMIC 0.1 50V
C72	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C76	1-161-894-00	CERAMIC 0.1 50V
C79	1-161-894-00	CERAMIC 0.1 50V
C80	1-161-894-00	CERAMIC 0.1 50V
C81	1-163-038-00	CERAMIC CHIP 0.1 25V
C82	1-163-038-00	CERAMIC CHIP 0.1 25V
C90	1-162-781-11	CERAMIC 0.022 5% 50V
C91	1-161-894-00	CERAMIC 0.1 50V
C92	1-161-894-00	CERAMIC 0.1 50V
C93	1-131-384-00	TANTALUM 15 10% 6.3V

Ref.No.	Part No.	Description
C98	1-161-894-00	CERAMIC 0.1 50V
C101	1-161-894-00	CERAMIC 0.1 50V
C104	1-161-894-00	CERAMIC 0.1 50V
C105	1-161-894-00	CERAMIC 0.1 50V
C106	1-161-894-00	CERAMIC 0.1 50V
C107	1-161-894-00	CERAMIC 0.1 50V
C108	1-161-894-00	CERAMIC 0.1 50V
C112	1-161-894-00	CERAMIC 0.1 50V
C113	1-161-894-00	CERAMIC 0.1 50V
C114	1-161-894-00	CERAMIC 0.1 50V
C115	1-161-894-00	CERAMIC 0.1 50V
C119	1-161-894-00	CERAMIC 0.1 50V
C121	1-161-894-00	CERAMIC 0.1 50V
C125	1-161-894-00	CERAMIC 0.1 50V
C201	1-161-894-00	CERAMIC 0.1 50V
C202	1-161-894-00	CERAMIC 0.1 50V
C203	1-161-888-00	CERAMIC 0.01 50V
C204	1-131-347-00	TANTALUM 1 10% 35V
C206	1-161-888-00	CERAMIC 0.01 50V
C208	1-131-368-00	TANTALUM 3.3 10% 16V
C209	1-131-368-00	TANTALUM
C212	1-131-368-00	TANTALUM 3.3 10% 16V
C214	1-161-887-11	CERAMIC 0.0068 50V
C215	1-161-887-11	CERAMIC 0.0068 50V
C216	1-161-887-11	CERAMIC 0.0068 50V
C217	1-161-887-11	CERAMIC 0.0068 50V
C218	1-161-887-11	CERAMIC 0.0068 50V
C219	1-161-887-11	CERAMIC 0.0068 50V
C224	1-161-887-11	CERAMIC 0.0068 50V
C227	1-161-894-00	CERAMIC 0.1 50V
C229	1-161-888-00	CERAMIC 0.01 50V
C235	1-124-555-00	ELECT 1000 20% 16V
C237	1-131-384-00	TANTALUM 15 10% 6.3V
C238	1-162-781-11	CERAMIC 0.022 5% 50V
C240	1-161-894-00	CERAMIC 0.1 50V
C241	1-161-888-00	CERAMIC 0.01 50V
C242	1-161-887-11	CERAMIC 0.0068 50V
C246	1-161-894-00	CERAMIC 0.1 50V
C247	1-163-038-00	CERAMIC CHIP 0.1 25V
C249	1-163-111-00	CERAMIC CHIP 56PF 5% 50V
C250	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
CN1	1-563-721-11	RECEPTACLE, RF

Ref.No.	Part No.	Description
CV1	1-141-260-00	TRIMAR
D1	8-719-911-19	1SS119
D2	8-719-911-19	1SS119
D3	8-719-911-19	1SS119
D4	8-719-911-19	1SS119
D5	8-719-911-19	1SS119
D6	8-719-908-10	QSCH-1754
D7	8-719-908-10	QSCH-1754
D8	8-719-908-10	QSCH-1754
D9	8-719-908-10	QSCH-1754
D10	8-719-908-10	QSCH-1754
D11	8-719-908-10	QSCH-1754
D12	8-719-908-10	QSCH-1754
D13	8-719-911-19	1SS119
D14	8-719-911-19	1SS119
D15	8-719-911-19	1SS119
D16	8-719-911-19	1SS119
D17	8-719-911-19	1SS119
D18	8-719-911-19	1SS119
D19	8-719-911-19	1SS119
D20	8-719-911-19	1SS119
D21	8-719-911-19	1SS119
D22	8-719-908-10	QSCH-1754
D23	8-719-908-10	QSCH-1754
D24	8-719-911-19	1SS119
D25	8-719-911-19	1SS119
D26	8-719-911-19	1SS119
D27	8-719-911-19	1SS119
D32	8-719-911-19	1SS119
D33	8-719-911-19	1SS119
D34	8-719-908-10	QSCH-1754
D35	8-719-908-10	QSCH-1754
D101	8-719-911-19	1SS119
D102	8-719-903-27	1SS168
D103	8-719-903-27	1SS168
D104	8-719-911-19	1SS119
D105	8-719-903-27	1SS168
D106	8-719-903-27	1SS168
D107	8-719-903-27	1SS168
D108	8-719-903-27	1SS168
D109	8-719-903-27	1SS168
D110	8-719-903-27	1SS168
D111	8-719-903-27	1SS168
D112	8-719-903-27	1SS168
D113	8-719-903-27	1SS168
D114	8-719-903-27	1SS168
D115	8-719-903-27	1SS168
D116	8-719-911-19	1SS119
D117	8-719-911-19	1SS119
D118	8-719-903-27	1SS168
D119	8-719-903-27	1SS168
D122	8-719-908-10	QSCH-1754
D123	8-719-903-27	1SS168
D124	8-719-903-27	1SS168
D125	8-719-911-19	1SS119
D126	8-719-911-19	1SS119
DL1	1-415-168-00	200nS
IC1	8-759-900-59	HI1-0201-5: HARRIS
IC2	8-759-908-86	HI1-201HS-5: HARRIS
IC3	8-759-900-59	HI1-0201-5: HARRIS
IC4	8-759-908-86	HI1-201HS-5: HARRIS
IC5	8-759-918-92	HA3-2525-5: HARRIS
IC6	8-759-923-77	HI1-5043-5: HARRIS
IC7	8-759-918-92	HA3-2525-5: HARRIS
IC8	8-759-918-92	HA3-2525-5: HARRIS
IC9	8-759-900-59	HI1-0201-5: HARRIS
IC10	8-759-923-77	HI1-5043-5: HARRIS
IC11	8-759-205-32	TC74HC374F: TOSHIBA
IC12	8-759-205-32	TC74HC374F: TOSHIBA
IC13	8-759-205-32	TC74HC374F: TOSHIBA
IC14	8-759-205-17	TC74HC174F: TOSHIBA
IC15	8-759-645-17	M54517P: MITSUBISHI
IC16	8-759-700-08	NJM4558S: JRC
IC17	8-759-205-23	TC74HC244F: TOSHIBA
IC18	8-759-205-09	TC74HC138F: TOSHIBA
IC20	8-759-900-59	HI1-0201-5: HARRIS
IC21	8-759-700-08	NJM4558S: JRC
IC22	8-759-918-92	HA3-2525-5: HARRIS
IC23	8-759-923-77	HI1-5043-5: HARRIS
IC24	8-759-908-86	HI1-201HS-5: HARRIS
IC25	8-759-205-32	TC74HC374F: TOSHIBA
IC26	8-759-205-32	TC74HC374F: TOSHIBA

Ref.No.	Part No.	Description
IC27	8-759-205-17	TC74HC174F: TOSHIBA
IC28	8-759-900-59	HI1-0201-5: HARRIS
IC29	8-759-900-59	HI1-0201-5: HARRIS
IC30	8-759-908-86	HI1-201HS-5: HARRIS
IC31	8-759-908-86	HI1-201HS-5: HARRIS
IC32	8-759-204-96	TC74HC04F: TOSHIBA
IC33	8-759-205-11	TC74HC153F: TOSHIBA
IC34	8-759-205-11	TC74HC153F: TOSHIBA
IC35	8-759-205-12	TC74HC157F: TOSHIBA
IC36	8-759-205-09	TC74HC138F: TOSHIBA
IC37	8-759-205-09	TC74HC138F: TOSHIBA
IC38	8-759-205-09	TC74HC138F: TOSHIBA
IC39	8-759-918-92	HA3-2525-5: HARRIS
IC40	8-759-700-08	NJM4558S: JRC
IC41	8-759-205-32	TC74HC374F: TOSHIBA
IC42	8-759-205-32	TC74HC374F: TOSHIBA
IC44	8-759-205-17	TC74HC174F: TOSHIBA
IC45	8-759-900-59	HI1-0201-5: HARRIS
IC46	8-759-908-86	HI1-201HS-5: HARRIS
IC49	8-759-980-38	ICL8038BCJD: INTERSIL
IC50	8-759-700-08	NJM4558S: JRC
IC51	8-759-202-86	TC74HC123P: TOSHIBA
IC52	8-759-900-59	HI1-0201-5: HARRIS
IC53	8-759-205-17	TC74HC174F: TOSHIBA
IC54	8-759-205-32	TC74HC374F: TOSHIBA
IC55	8-759-205-17	TC74HC174F: TOSHIBA
IC56	8-759-900-59	HI1-0201-5: HARRIS
IC57	8-759-908-86	HI1-201HS-5: HARRIS
IC58	8-759-900-59	HI1-0201-5: HARRIS
IC59	8-759-918-92	HA3-2525-5: HARRIS
IC60	8-759-918-92	HA3-2525-5: HARRIS
IC61	8-759-923-77	HI1-5043-5: HARRIS
IC62	8-759-908-86	HI1-201HS-5: HARRIS
IC63	8-759-908-86	HI1-201HS-5: HARRIS
IC64	8-759-205-06	TC74HC74F: TOSHIBA
IC65	8-759-205-06	TC74HC74F: TOSHIBA
IC68	8-759-900-59	HI1-0201-5: HARRIS
IC69	8-759-918-92	HA3-2525-5: HARRIS
IC70	8-759-918-92	HA3-2525-5: HARRIS
IC71	8-759-918-92	HA3-2525-5: HARRIS
IC72	8-759-918-92	HA3-2525-5: HARRIS
IC73	8-759-939-40	LM3046N: NSC
IC74	8-759-700-08	NJM4558S: JRC
IC75	8-759-700-08	NJM4558S: JRC
IC76	8-759-700-08	NJM4558S: JRC

Ref.No.	Part No.	Description
IC77	8-759-918-92	HA3-2525-5: HARRIS
IC78	8-759-700-65	NJM79L05A: JRC
IC79	8-759-708-05	NJM78L05A: JRC
IC80	8-759-914-01	AD7524JN: ANALOG DEVICES
IC81	8-759-918-92	HA3-2525-5: HARRIS
IC101	8-759-930-80	CA3080E: RCA
IC102	8-759-930-80	CA3080E: RCA
IC103	8-759-708-05	NJM78L05A: JRC
Q1	8-729-117-54	2SA1175
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-117-54	2SA1175
Q5	8-729-103-19	2SA1206-K1
Q6	8-729-103-19	2SA1206-K1
Q7	8-729-117-54	2SA1175
Q8	8-729-103-19	2SA1206-K1
Q9	8-729-117-54	2SA1175
Q10	8-729-178-54	2SC2785
Q11	8-729-117-54	2SA1175
Q12	8-729-117-54	2SA1175
Q13	8-729-178-54	2SC2785
Q14	8-729-178-54	2SC2785
Q15	8-729-266-83	2SC2668
Q16	8-729-266-83	2SC2668
Q17	8-729-266-83	2SC2668
Q18	8-729-178-54	2SC2785
Q19	8-729-117-54	2SA1175
Q20	8-729-117-54	2SA1175
Q21	8-729-103-19	2SA1206-K1
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-178-54	2SC2785
Q24	8-729-117-54	2SA1175
Q25	8-729-266-83	2SC2668
Q26	8-729-117-54	2SA1175
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q30	8-729-117-54	2SA1175
Q31	8-729-178-54	2SC2785
Q32	8-729-266-83	2SC2668
Q33	8-729-178-54	2SC2785
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668
Q36	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q37	8-729-117-54	2SA1175
Q38	8-729-103-19	2SA1206-K1
Q39	8-729-117-54	2SA1175
Q40	8-729-266-83	2SC2668
Q41	8-729-266-83	2SC2668
Q42	8-729-266-83	2SC2668
Q43	8-729-103-19	2SA1206-K1
Q44	8-729-178-54	2SC2785
Q45	8-729-117-54	2SA1175
Q46	8-729-117-54	2SA1175
Q47	8-729-117-54	2SA1175
Q48	8-729-117-54	2SA1175
Q49	8-729-117-54	2SA1175
Q50	8-729-178-54	2SC2785
Q51	8-729-117-54	2SA1175
Q52	8-729-178-54	2SC2785
Q53	8-729-117-54	2SA1175
Q54	8-729-266-83	2SC2668
Q55	8-729-178-54	2SC2785
Q56	8-729-178-54	2SC2785
Q57	8-729-117-54	2SA1175
Q58	8-729-117-54	2SA1175
Q59	8-729-178-54	2SC2785
Q60	8-729-178-54	2SC2785
Q62	8-729-266-83	2SC2668
Q63	8-729-117-54	2SA1175
Q64	8-729-266-83	2SC2668
Q66	8-729-103-19	2SA1206-K1
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-266-83	2SC2668
Q69	8-729-266-83	2SC2668
Q70	8-729-178-54	2SC2785
Q71	8-729-117-54	2SA1175
Q72	8-729-103-19	2SA1206-K1
Q73	8-729-103-19	2SA1206-K1
Q74	8-729-103-19	2SA1206-K1
Q75	8-729-103-19	2SA1206-K1
Q76	8-729-103-19	2SA1206-K1
Q77	8-729-117-54	2SA1175
Q78	8-729-117-54	2SA1175
Q79	8-729-178-54	2SC2785
Q80	8-729-103-19	2SA1206-K1
Q81	8-729-103-19	2SA1206-K1
Q82	8-729-103-19	2SA1206-K1
Q83	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q84	8-729-266-83	2SC2668
Q85	8-729-117-54	2SA1175
Q86	8-729-117-54	2SA1175
Q87	8-729-266-83	2SC2668
Q88	8-729-266-83	2SC2668
Q89	8-729-178-54	2SC2785
Q90	8-729-266-83	2SC2668
Q91	8-729-117-54	2SA1175
Q92	8-729-266-83	2SC2668
Q93	8-729-266-83	2SC2668
Q94	8-729-117-54	2SA1175
Q95	8-729-117-54	2SA1175
Q96	8-729-117-54	2SA1175
Q97	8-729-266-83	2SC2668
Q98	8-729-178-54	2SC2785
Q99	8-729-266-83	2SC2668
Q100	8-729-266-83	2SC2668
Q101	8-729-117-54	2SA1175
Q102	8-729-266-83	2SC2668
Q103	8-729-117-54	2SA1175
Q104	8-729-266-83	2SC2668
Q105	8-729-266-83	2SC2668
Q106	8-729-178-54	2SC2785
Q107	8-729-266-83	2SC2668
Q201	8-729-117-54	2SA1175
Q202	8-729-117-54	2SA1175
Q203	8-729-117-54	2SA1175
Q204	8-729-117-54	2SA1175
Q205	8-729-178-54	2SC2785
Q206	8-729-178-54	2SC2785
Q208	8-729-117-54	2SA1175
Q209	8-729-117-54	2SA1175
Q210	8-729-178-54	2SC2785
Q211	8-729-178-54	2SC2785
Q212	8-729-266-83	2SC2668
Q213	8-729-117-54	2SA1175
R36	1-215-449-00	METAL 15K 1% 1/6W
R129	1-215-449-00	METAL 15K 1% 1/6W
R195	1-216-085-00	METAL CHIP 33K 5% 1/10W
R222	1-216-042-00	METAL CHIP 510 5% 1/10W
R225	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R233	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R278	1-216-061-00	METAL CHIP 3.3K 5% 1/10W

Ref.No.	Part No.	Description
R301	1-216-085-00	METAL CHIP 33K 5% 1/10W
R302	1-216-041-00	METAL CHIP 470 5% 1/10W
R310	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
R331	1-216-073-00	METAL CHIP 10K 5% 1/10W
R338	1-216-095-00	METAL CHIP 82K 5% 1/10W
R341	1-216-081-00	METAL CHIP 22K 5% 1/10W
R342	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
R357	1-216-085-00	METAL CHIP 33K 5% 1/10W
R358	1-216-053-00	METAL CHIP 1.5K 5% 1/10W
R359	1-216-065-00	METAL CHIP 4.7K 5% 1/10W
R360	1-216-061-00	METAL CHIP 3.3K 5% 1/10W
R361	1-216-073-00	METAL CHIP 10K 5% 1/10W
RB1	1-235-949-11	RESISTOR BLOCK
RB2	1-235-949-11	RESISTOR BLOCK
RB3	1-235-949-11	RESISTOR BLOCK
RB4	1-235-949-11	RESISTOR BLOCK
RB5	1-235-949-11	RESISTOR BLOCK
RB7	1-235-949-11	RESISTOR BLOCK
RV1	1-228-459-00	METAL 10K
RV2	1-228-456-00	METAL 1K
RV3	1-228-456-00	METAL 1K
RV5	1-228-455-00	METAL 500
RV6	1-228-454-00	METAL 200
RV8	1-228-456-00	METAL 1K
RV9	1-228-456-00	METAL 1K
RV12	1-228-454-00	METAL 200
RV13	1-228-455-00	METAL 500
RV14	1-228-459-00	METAL 10K
RV16	1-228-461-00	METAL 50K
RV17	1-228-456-00	METAL 1K
RV18	1-228-456-00	METAL 1K
RV19	1-228-456-00	METAL 1K
RV21	1-228-456-00	METAL 1K
RV22	1-228-456-00	METAL 1K
RV23	1-228-457-00	METAL 2K
RV24	1-228-457-00	METAL 2K
RV25	1-228-457-00	METAL 2K
RV26	1-228-461-00	METAL 50K
RV28	1-228-456-00	METAL 1K
RV29	1-228-456-00	METAL 1K
RV31	1-228-459-00	METAL 10K
RV33	1-228-459-00	METAL 10K
RV34	1-228-458-00	METAL 2K

Ref.No.	Part No.	Description
RV35	1-228-458-00	METAL 5K
RV36	1-228-459-00	METAL 10K
RV37	1-228-459-00	METAL 10K
RV38	1-228-459-00	METAL 10K
RV39	1-228-459-00	METAL 10K
RV40	1-228-459-00	METAL 10K
RV41	1-228-458-00	METAL 5K
RV42	1-228-459-00	METAL 10K
RV101	1-228-456-00	METAL 1K

Ref.No.	Part No.	Description
FRAME		
	⚠1-413-271-11	SWITCHING REGULATER (ES-10-12)
	⚠1-413-272-11	SWITCHING REGULATER (ES-9-5)
	1-558-957-11	FLATE CABLE ASSY
	1-558-957-21	FLATE CABLE ASSY
	1-558-958-11	FLATE CABLE ASSY 40P
	1-558-997-11	FLATE CABLE ASSY 10P
	1-561-655-21	RECEPTACLE, 9P FEMALE "REMOTE 1(S10)"
	1-561-897-21	RECEPTACLE, 15P FEMALE "VE"
	1-561-899-21	RECEPTACLE, 50P FEMALE
	1-562-323-21	RECEPTACLE, 25P FEMALE "TALLY OUT"
	1-563-078-11	RECEPTACLE, 15P MALE
	1-566-293-11	RECEPTACLE, 250 FEMALE "PIO"
	1-938-283-11	RE CONNECTOR CABLE WITH HARNESS
	1-560-163-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
	1-938-283-21	RE CONNECTOR CABLE WITH HARNESS
	1-560-163-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
⚠CB101	1-532-793-11	BREAKER
CN37	1-938-290-31	BL CABLE WITH HARNESS
	1-560-163-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
CN38	1-561-336-11	BNC CONNECTOR
CN39	1-561-336-11	BNC CONNECTOR
CN41	1-938-290-51	BL CABLE WITH HARNESS
	1-560-163-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
IC101	8-759-939-55	LT350AK: LINEAR TECHNOLOGY
IC102	8-759-939-54	LT1033CK: LINEAR TECHNOLOGY
M101	8-838-100-01	FAN
RV101	1-237-495-11	JOY STICK 5K
S101	1-570-743-21	AC POWER
⚠T101	1-448-771-12	TRANSFORMER ASSY, POWER
	1-508-681-00	SMALL CONNECTOR R HOUSING 3P FEMALE
	1-508-682-00	SMALL CONNECTOR P HOUSING 3P FEMALE
	1-535-070-11	MINIATURE MALE CONTACT
	1-535-072-00	MINIATURE FEMALE CONTACT
	1-561-829-00	SMALL CONNECTOR R HOUSING 2P FEMALE
	1-561-830-00	SMALL CONNECTOR P HOUSING 2P FEMALE

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